



Pacific Mine Tailings Closure
Administrative Record

North Fork American Fork Canyon

A Time Critical Removal Action

Ordered June 8, 2000

By

Jack A. Blackwell

Intermountain Regional Forester

Forest Service

Prepared By

Ted V. Fitzgerald, On-Scene Coordinator

Uinta National Forest

PACIFIC MINE TAILINGS CLOSURE PROJECT
TIME CRITICAL ADMINISTRATIVE RECORD
AMERICAN FORK CANYON

This record is provided by the Forest Service to present the general public with an overview of the pertinent information and data which resulted in a decision to invoke a Time Critical Removal Action at Pacific Mine under authorities established by the *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA).

The American Fork Mining District was established in the North Fork of American Fork Canyon in 1870. Hundreds of mining claims, many resulting in the land being patented and becoming private property, were filed in the ensuing years. Mining for precious metals continued at various levels of activity until the 1950's at several productive sites. The Pacific Mine is one of the bigger mines that was developed. Mine tailings and waste rock generated by the mine still cover approximately 4 acres, most of it located on National Forest System Lands. The tailings contain concentrations of heavy metals that are potentially hazardous to human health or welfare, and when released into the environment are deleterious, particularly to aquatic resources.

Pacific mine has been inactive for several decades. The buildings and other surface improvements constructed at the site have been removed and the tunnels plugged with earth embankments. However, water containing high levels of lead, zinc, cadmium, and other metals is being discharged from the mine workings. The discharge flows across the tailings pile increasing in metal concentration before running directly into the river. This site has become a popular motorized recreation site for ATV and motorcycle enthusiasts despite Forest Service regulations restricting this type of use at this location. This use accelerates the erosion of the tailings into the stream.

Closure of the site utilizing guardrail barriers and interpretive signing will reduce erosion at the site, provide stream diversions to prevent the mine discharge from running across the tailings, reduce human exposure to potentially hazardous materials, and reduce the concentration of heavy metals in the North Fork of American Fork River.

Additional information about this project is available at the Forest Supervisor's Office, 88 W 100 N, Provo, Utah or the Pleasant Grove Ranger District, 390 N 100 E, Pleasant Grove, Utah.

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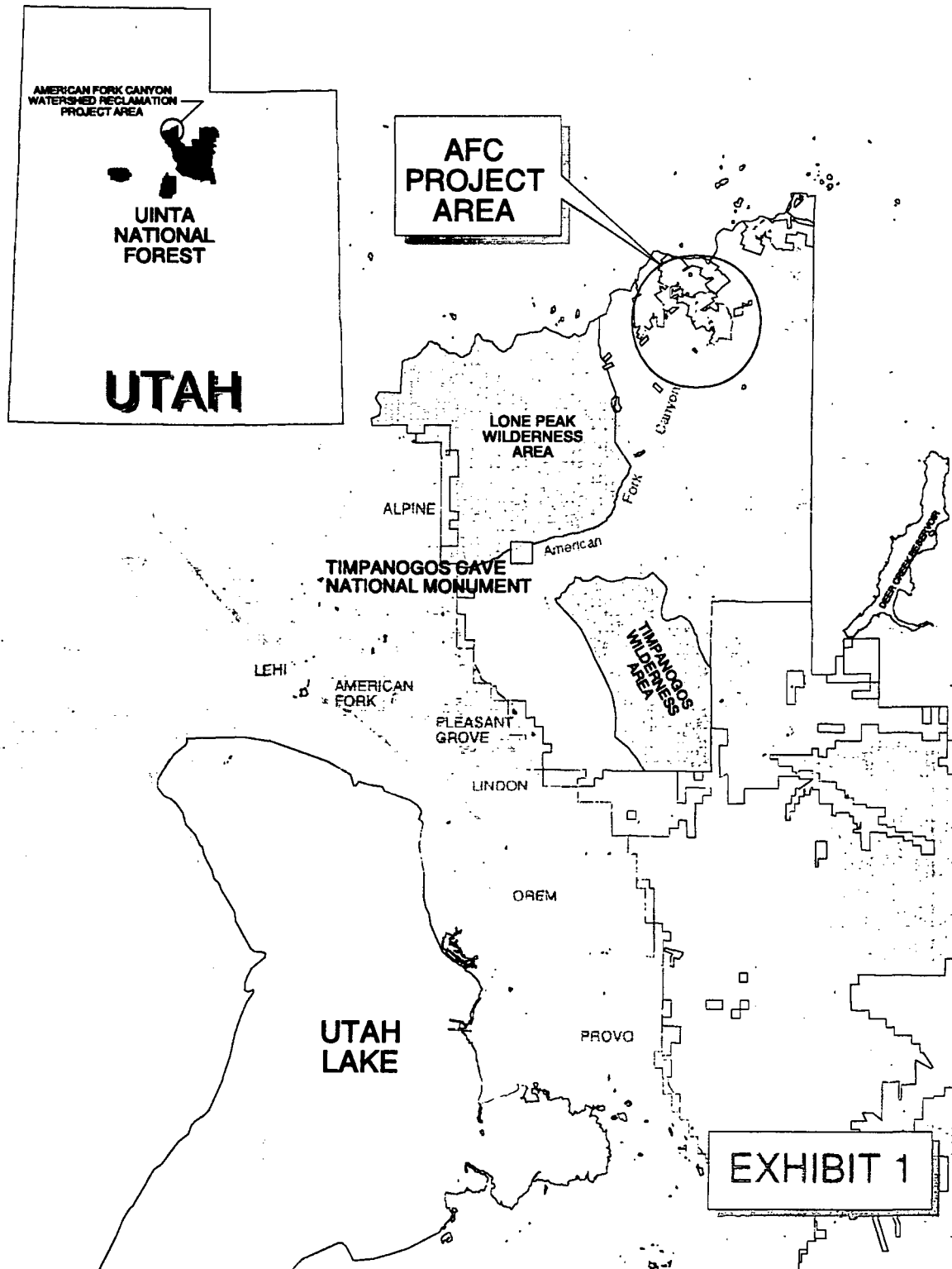
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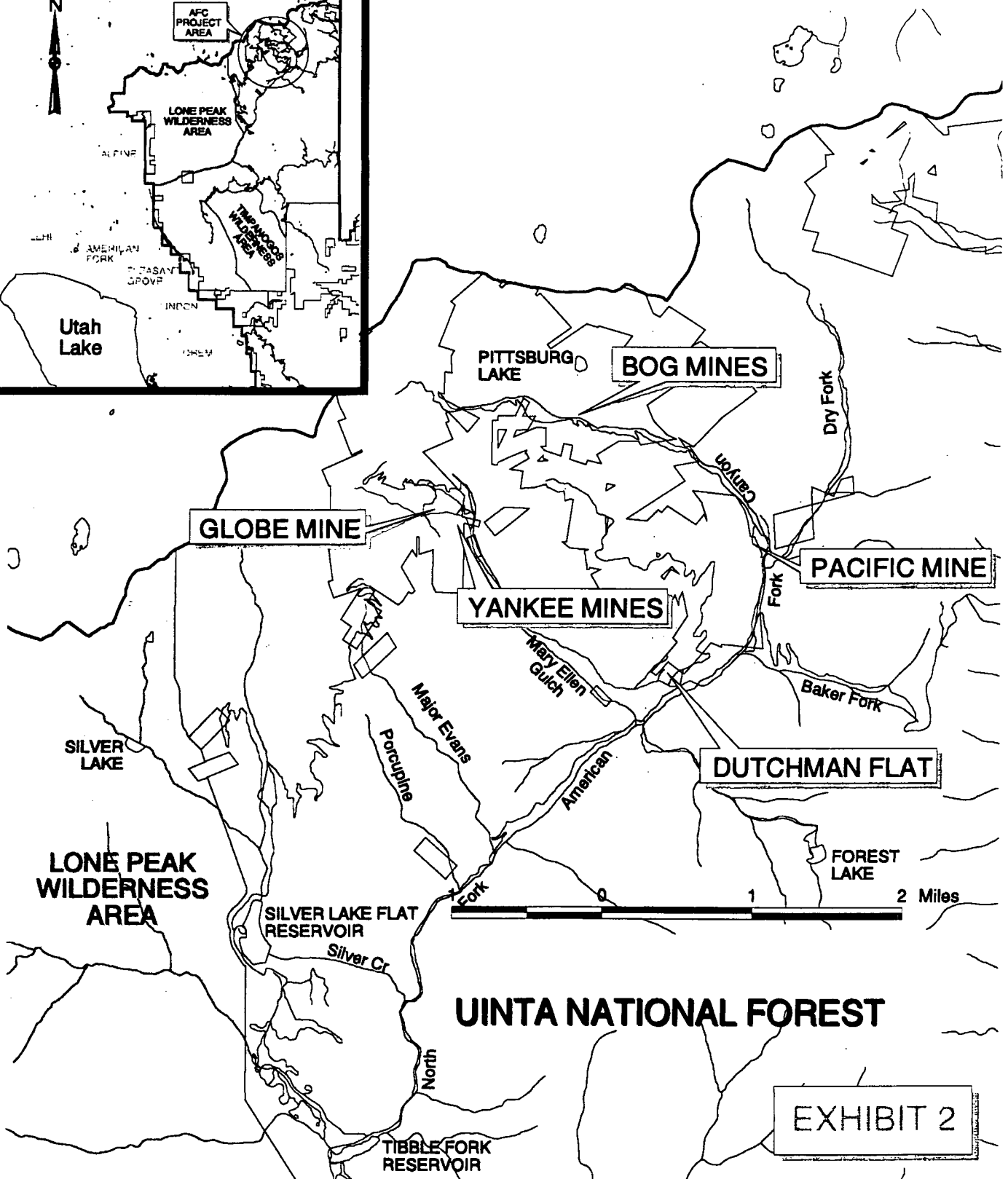
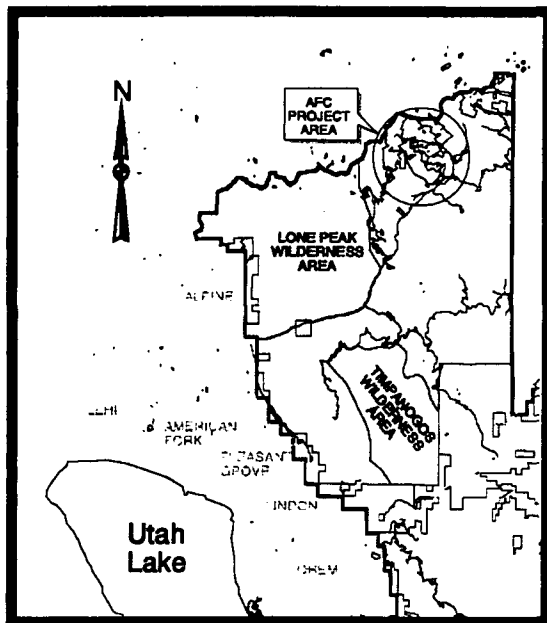
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AMERICAN FORK CANYON WATERSHED RECLAMATION PROJECT

SITE MAP



AMERICAN FORK CANYON WATERSHED RECLAMATION PROJECT PROJECT LOCATION MAP



CENTERLINE
OF ROADS

NORTH FORK
AMERICAN FORK
RIVER

BEAVER
POND

WETLANDS

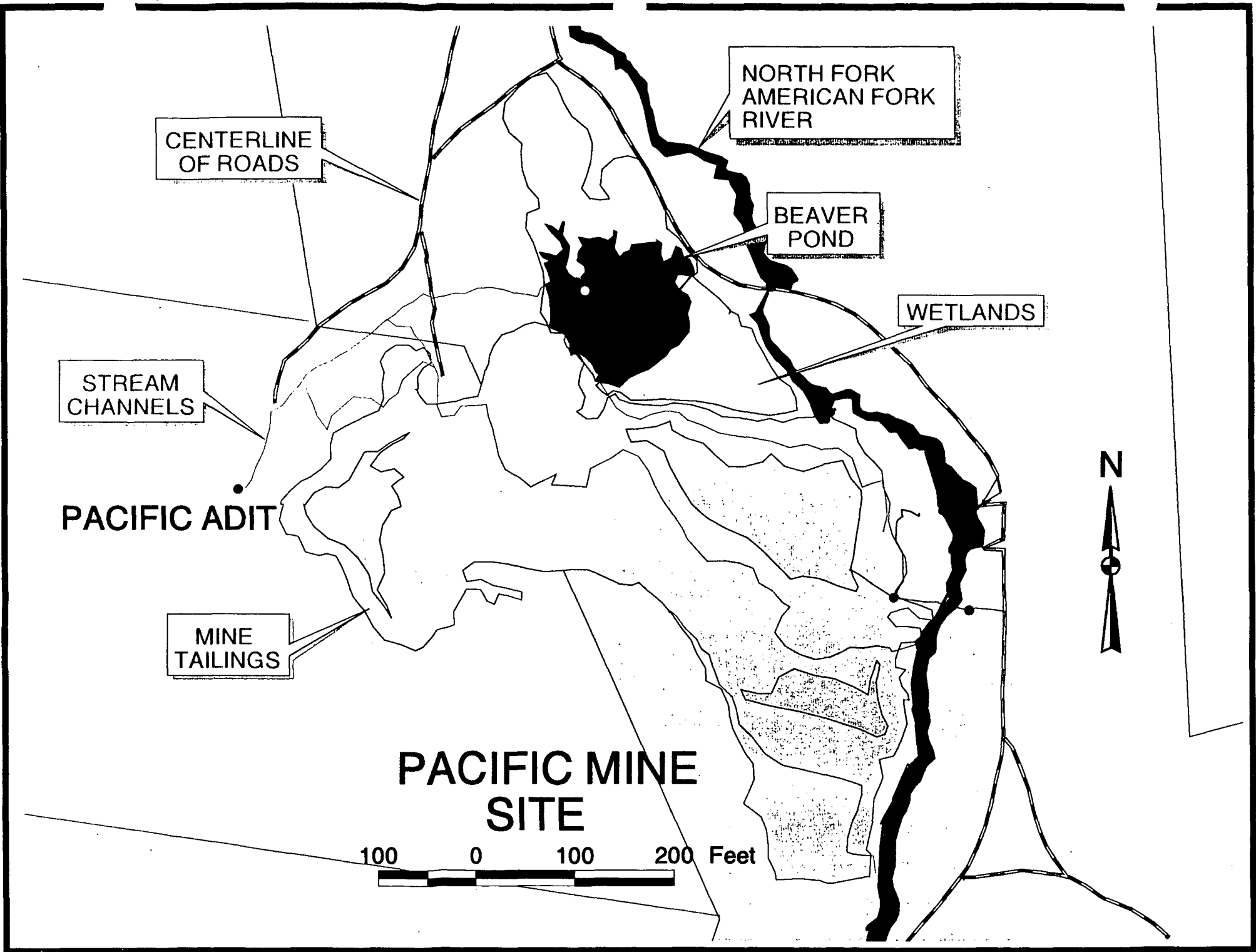
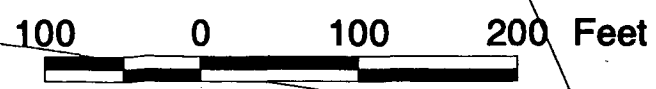
STREAM
CHANNELS

PACIFIC ADIT

MINE
TAILINGS



PACIFIC MINE
SITE



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ACTION MEMORANDUM

Pacific Mine Site

PURPOSE

A release, or significant threat of a release, of hazardous substances that potentially pose a threat to public health, welfare, or the environment has occurred or may occur at the Pacific Mine (or the site) on and/or from lands under the jurisdiction, custody, or control of the USDA Forest Service, Uinta National Forest (National Forest System or NFS lands), Pleasant Grove Ranger District.

The purpose of this Action Memorandum is to document, pursuant to the guidelines of the *National Oil and Hazardous Substance Contingency Plan (NCP)*, 40 CFR 300, et. Seq. (1995), the decision to initiate a CERCLA Time Critical Removal Action, as authorized by *Section 104 (42 USC 9604) or the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA; 42 USC 9601 et seq.)*, and *Executive Order 12580, 52 Federal Register 2923-26 (January 23, 1987)*. For the reasons herein stated, I hereby authorize the below described actions to occur on National Forest System lands.

SITE CONDITIONS AND BACKGROUND

The site is located at an elevation of 7,800 feet, adjacent to the North Fork of the American Fork River, American Fork Canyon, Utah County, Utah. The site is in Section 22, T3S, R3E, SLB&M. (See *Project Site Map - Exhibit 1*)

The Pacific Mine site is characterized by a waste rock and tailings pile (over 3 acres), adits that have been closed with native soils and rock but are producing mine drainage, concrete pillars and foundations, and timber cribs. (See *Pacific Mine Site map attached*) This site was docketed by the Environmental Protection Agency (EPA) on it's Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) on January 24, 1992, based on water quality and macroinvertebrate data collected by or for the Uinta National Forest in 1988. The site was determined to be eligible for listing in the National Register of Historic Places in a June 8, 1994 report entitled "*Heritage Resource Inventory of American Fork Area Mine Closures, Utah County, Utah*".

The adits, historic constructed features, and waste rock piles are predominantly on patented (private) lands while the tailings piles are principally located in trespass on NFS lands.

American Fork Canyon has over 1.2 million visitors pass through a fee collection station at the mouth of the canyon each year. The majority of those visitors live in Utah Valley or in the cities to the north along the Wasatch Front. The popularity of the North Fork of

American Fork Canyon is in part due to the fact that it comprises a block of public and private lands totaling 14,500 acres classified as "Roaded" with roads and trails open to ATV use. It is surrounded by much larger areas of Designated Wilderness and Inventoried Unroaded Lands. Some people come to the North Fork to recreate because it is less restricted than any other NFS lands in as close a proximity to Utah's population center. *(See the ATV Riding Opportunities on NFS Lands Along the Wasatch Front map attached.)*

The Uinta National Forest completed its Land and Resource Management Plan in 1984. The site falls within the Pleasant Grove Management Area #2. The Plan states that population increases nearby will place increased demand on the area. Recreation-related activities will probably be the major use. Recreational use in the project area includes motorized sight seeing, ATV and Jeep riding, fishing, exploring mine sites, picnicking, hiking, camping, hunting, and equestrian riding. Heavy use is made of the streams and old mine sites. The portion of the site administered by the Forest Service are predominantly designated for dispersed recreation opportunities but use of motorized recreational vehicles on the site is restricted by the Uinta's Travel Management Plan.

None-the-less, the Pacific Mine site remains a popular motorized recreation destination because of its close proximity to urbanized Utah Valley, the climatic relief it offers during hot summer days, its undulating terrain void of vegetation, the water running across the site, and a size large enough to accommodate several riders at the same time. There are individuals who frequent this site almost daily during the summer months preferring it to the roads and trails designated on the Forest for ATV use. At times this site appears to be the location of a motocross event from the stunts exhibited by the more experienced riders. This heavy use results in an unstable, unconsolidated, and uncrusted surface that is very susceptible to erosion from wind and water.

Notable tourist attractions are the historic mining landscape of the area amidst the scenic beauty of the canyon and the large skiing recreational use being continuously developed in the area. In 1999 ski runs and lifts were constructed in the headwaters of American Fork Canyon by Snowbird Ltd. accessed from their resort in Little Cottonwood Canyon on the Wasatch-Cache National Forest. Snowbird, or its principal owners, have also purchased many of the patented land parcels lower in the canyon, including Blue Rock No. 2 where Pacific Mine is located.

The watershed is defined topographically as high, rugged alpine peaks and lakes in cirque basins, steep to moderately steep timbered slopes, narrow canyon bottoms and brush/grass covered slopes and ridges. The watershed ranges in elevation from 6,000 feet to 11,000 feet. The vegetation types in the area are aspen, spruce/fir, dry and wet meadows vegetation, subalpine and alpine herblands. The annual average precipitation is 50 inches, mostly in the form of snow. The unit is also highly mineralized with many historic mines and mills present, and has, in the past, been under intense scrutiny by both independent miners and mining companies.

The area provides habitat for elk, mule deer, bighorn sheep, Rocky Mountain goat, black bear, moose, mountain lion, marmot, and abundant beaver. The river is important spawning and rearing streams for Bonneville cutthroat trout (a sensitive species), brown and rainbow trout. Utah State classifies American Fork River as a Class 3-A Cold Water Fishery.

THREATS TO PUBLIC HEALTH OR WELFARE AND THE ENVIRONMENT

Removal Site Evaluation

As described earlier, the site consists of a mine tailings and waste rock pile and two adits. Under the Clean Water Act Action Plan, funding was provided to the Forests for abandoned mine land watershed restoration projects. Through this funding mechanism, thorough studies were conducted on water quality, soils, and biological organisms to assess the full affects of the mine sites. Water quality sampling, Macroinvertebrate inventories, soils analyses, sediment sampling, and fish tissue sampling have identified the Pacific Mine as the site exhibiting and releasing the largest concentrations of hazardous materials in the American Fork Mining District. The tailings deposit impinges on the North Fork of American Fork River, in places forming the banks of the stream, and contain an abundance of heavy metals including lead at an average concentration of 17,000 parts per million (ppm), cadmium 44 ppm, copper 335 ppm, zinc 6,000 ppm, arsenic 165 ppm, barium 1850 ppm, and iron 14,000 ppm in the minus 4 soil fraction.

The southeast adit is discharging mine drainage at an average flow rate of approximately 0.3 cubic feet per second, fluctuating seasonally. The discharge has a near neutral pH of 6.5 but contains concentrations of lead at 25 parts per billion (ppb) and zinc at up to 1800 ppb, along with various other heavy metals. Flows entering the river after running across the tailings piles have been measured to increase in lead content from 25 ppb to 4,000 ppb while the zinc levels show minor change.

An attempt was made to reduce the quantity of hazardous substances being released into the North Fork of American Fork River in 1995. That effort consisted of constructing a limestone lined, open channel to divert mine discharge waters off the tailings pile into a wetland and beaver pond adjacent to the site. The effectiveness of the channel was short lived because it was compromised by the heavy ATV/motorcycle use made of this site by motorized recreationists. Presently, most of the mine drainage is continuing to flow across (and within) the tailings pile before discharging directly into the North Fork of American Fork River. Below is an overview of some of the samples taken at the site for surface water, ground water, soil, and air.

Macroinvertebrate inventories and fish tissue samples demonstrate the impacts this site is having on the aquatic habitat downstream. The Macroinvertebrate populations in the river were reduced from almost 14,000 individuals per square meter above the mine to less than 4,000 below Pacific Mine. The diversity index of species fell from 10 to less than 2. Fish were sampled from the river, including 4 from above Pacific Mine and 4

from below the mine. The three native cutthroat and one resident rainbow from below the mine all had lead concentrations in their tissues exceeding that recommended for human consumption. In comparison the fish below the mine had an average of almost 10 times as much lead as those above the site, with an individual fish exhibiting 20 times more lead below the mine versus individuals above the mine.

Pacific Mine site has been the focus of several studies conducted by graduate students seeking advanced degrees from the University of Wyoming and from Utah State University. One Master of Science candidate, Phyllis Ann Bustamante, reported:

“The total Pb content at this site is considerably above the EPA threshold and exists in a form that is harmful to human health... Lead at this site may pose a threat to human health if ingested by children... If this area is to be visited by historians and recreationalists, signs should be posted informing people of the potential hazards of the tailings... Measures should be taken to keep off-road vehicles off of the tailings in order to reduce erosion potential.”

In a January 18, 2000 memorandum to the Forest Supervisor from Uinta National Forest's Hydrologist, Bob Gecy, recommendation was made to close the Pacific Mine to recreational use. His concerns centered on the high levels of contaminants at the site that could become air borne dust occurring naturally, or caused from ATV riding, that could be inhaled at concentrations hazardous to human health. In July 1985, Ben Albrechtsen, R-4 Reclamation Specialist, recommended closure of the site to off-road vehicles to reduce disturbance at the site and testing to determine the contamination level at the site.

***Temporary Remedy of a Release, or Threatened Release,
Into the Environment
Of a Hazardous Substance, Pollutant, or Contaminant***

A CERCLA Time-Critical Removal Action is necessary to reduce exposure of Forest visitors to airborne lead particulates, and the release of heavy metals leached from the tailings pile into the environment in the vicinity of Pacific Mine and downstream in the North Fork of American Fork Canyon.

ACTIONS TAKEN TO DATE

After listing of the Pacific Mine on EPA's CERCLIS in 1992, the Uinta National Forest completed a Preliminary Analysis of Pacific Mine and other sites in the American Fork Mining District. Releases of hazardous substances and contamination of National Forest resources were confirmed through the analysis that was completed in June 1994. The analysis considered the 1988 investigations and additional water quality sampling and testing done under contract by Lidstone and Anderson in 1992.

Further soils, water, and fish sampling was conducted in 1998 and 1999. All tests indicated and confirmed releases from Pacific Mine. The Intermountain Region

contracted to have the Potentially Responsible Parties (PRP's) identified for some of the potential reclamation sites in American Fork Canyon. Letters were sent to PRP's requesting information about their involvement in the mining activities and ownership of the offending sites in the canyon. A meeting was held with a few PRP's involved with Pacific Mine. Additional PRP's were identified for the site and letters of discovery were sent to them. Negotiations with Pacific Mine's PRP's are expected to resume in the summer of 2000.

In October 1999, the Forest Supervisor and Regional Forester assigned Ted Fitzgerald to the position of On-Scene Coordinator for the American Fork Canyon Watershed Reclamation Project. On January 24, 2000, a meeting was held between the Forest Service, Utah Division of Water Quality, and the Utah Division of Oil, Gas, and Mining. It was recognized by all the participants that the data that has been collected for Pacific Mine indicates closure of the site to recreational uses should occur as quickly as procedures will allow.

A Community Relations Plan was developed to describe the efforts to be taken to involve other Federal, State, and local agencies in this project and how to inform the public about the pending actions at Pacific Mine and other sites in American Fork Mining District. Letters were sent to elected officials on February 25, 2000 alerting them to these pending actions. Forest Representatives met with the Utah County Council of Governments on March 2, 2000 to inform County Commissioners and Mayors of the hazardous materials concerns in American Fork Canyon and actions that were developing directed at correcting those problems.

On March 7, 2000 Forest Service officials met with representatives of the Utah Division of Water Quality, Utah Division of Wildlife Resources, and Utah County Department of Health and presented them with the data that had been collected in American Fork Canyon. They were subsequently asked to review the data and determine the significance of that information pertaining to public health and welfare. Utah County's Health Department letter of May 1, 2000 states,

"Concerning the Pacific Mine tailings, we would recommend posting and/or fencing the area to exclude recreational ORV riders from further disturbing the site. We would also recommend posting other potentially hazardous mine tailing sites in the north fork to help prevent airborne dust from further contaminating the air and water near these sites."

On March 28, 2000 a mass mailing of letters to Forest Users was done alerting them to the need for remedial actions in American Fork Canyon and the anticipated efforts that will occur in the near future.

The responses by Pacific Mine PRP's are being reviewed by the Office of General Counsel to determine which PRP's may have responsibilities for clean-up of the mine site. It is anticipated that several months, including the 2000 summer season, will pass before any positive action on the part of PRP's will be accomplished to reduce the

potential for additional releases of hazardous materials from this site, unless the Forest Service initiates action to control the pollution resulting from tailings and activities on NFS lands. The Forest Service will coordinate its efforts with the EPA, the Utah Department of Environmental Quality (UDEQ), and owners of affected private lands.

STATUTORY AND REGULATORY AUTHORITIES

From my review of the conditions at Pacific Mine and the documentation above, I have determined that there is a threat to public health or welfare, and to the environment, as set forth in the National Contingency Plan at 40 C.F.R. 300.415(b)(2).

The Forest Service has CERCLA authority and is designated as "lead-agency" for lands under its jurisdiction and control at non-National Priorities List sites. No other appropriate response mechanisms or authorities are currently available to deal with hazardous waste at abandoned mine sites on National Forest System lands.

In compliance with the Forest Service's role in protecting the public health and welfare and the environment, and because the documented releases are on, or potentially impact, lands under the jurisdiction of the Uinta National Forest, and pursuant to the authority found at 42 U.S.C. 9604(a), Executive Order 12580, and 7 C.F.R. 2.60 (1993), I am issuing this Removal Action Memorandum. I am directing the Forest Supervisor to take immediate steps to close Pacific Mine to recreation uses by the general public and to maintain that closure until final reclamation of the site is completed and the threat of additional releases of hazardous substances from this site no longer exists.

Although the Forest Service specifically denies any liability in this situation, it will be the "lead agency" for all response actions occurring on National Forest System lands, as defined by the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. part 300, and all response actions will be consistent with the NCP.

PROPOSED ACTION

The proposed action includes measures to close the portion of the Pacific Mine site on NFS lands to recreationists and others, excepting officials engaged in preparation or implementation of reclamation plans for the site. This is to be accomplished by:

1. Notifying the public of the closure, and purpose therefore, through media releases and signing at the site.
2. Constructing and maintaining physical barricades to block all access points for motorized vehicles to the NFS lands at the site. Maintain signing at the site to explain the need for the closure.
3. Repairing the previously constructed channels to prevent mine drainage from flowing across the tailings deposits.

4. Coordinating efforts with the EPA, the UDEQ, and owners of affected private lands to adequately protect human health and the environment.

This action is time-critical as a planning period of at least six months does not exist before on-site activities must be initiated to reduce the threat to human health and welfare, and to the environment. If a six months planning period were allowed to elapse, no work activity would take place in the 2000 field season, and subsequent actions would be delayed further into the future.

This removal action will, to the extent practical, contribute to the efficient performance of any long-term remedial action.

Any removal action on-site will comply with all of the substantive provisions of Federal and State Applicable or Relevant and Appropriate Requirements (ARARs), to the extent practical considering the exigencies of the situation, and in consultation with the State of Utah and EPA. No federal, state, or local permit shall be required for any removal or remedial action occurring on-site pursuant to 42 U.S.C. 9621(e)(1). For the purposes of the Forest Service response actions in the American Fork Mining District, "on-site" is defined as National Forest System lands, or other suitable areas in very close proximity to the contamination, that the Forest Service deems necessary for implementation of this and other related CERCLA response actions. In general, the ARARs will consist of Utah State Division of Water Quality adopted stream water quality standards. The Forest Service has requested UDEQ provide a list of specific ARARs pertaining to these pending actions. It is anticipated that information will be received prior to implementing any removal actions on-site.

If CERCLA requirements for the federal lands can be timely met, it is anticipated that the proposed removal action will commence in June 2000. Overall project work plans call for portions of the response actions to be initiated this year, while other non time-critical portions of the overall removal plan will be initiated and completed in subsequent years.

EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

Should the proposed action be delayed, threats to public health and to the environment will continue and harm to individuals or resources could occur. Should the action not be taken, the potential for harm to individuals or resources will continue permanently. Additionally, continuing progress on the Pacific Mine site will demonstrate the Government's resolve to take action at offending sites in the American Fork Mining District and will encourage PRP's for other CERCLA sites in the canyon to address their sites.

ADMINISTRATIVE RECORD AND COMMUNITY RELATIONS

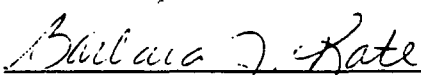
Pursuant to 40 C.F.R. 300.415(m), Peter W. Karp, Uinta National Forest Supervisor, has designated Loyal Clark as spokesperson for this action. I reaffirm the designation of Ted Fitzgerald in his functions as On-Scene Coordinator.

The Administrative Record for this time critical removal action will be available during regular business hours at the Forest Supervisor's Office in Provo, Utah within 60 days of the initiation of on-site removal activity. A Notice of Availability of Administrative Record will be published in the Daily Herald newspaper when the Administrative Record is available for public inspection. A public comment period of at least 30 days will be provided from the date the Administrative Record is made available for public inspection. Written responses will be prepared to address significant comments on the Administrative Record.

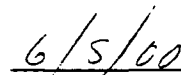
DECISION

By this memorandum, I find that a CERCLA time-critical removal action at the Pacific Mine site, American Fork Mining District, to be conducted by the Uinta National Forest, with expected cooperation from EPA, UDEQ and owners of affected private lands, is appropriate and I hereby direct that it be implemented.

By copy of this Action Memorandum, I am formally notifying USEPA Region 8 and the State of Utah of my finding of the appropriateness of a CERCLA removal action at the Pacific Mine site of the American Fork Mining District.



JACK A. BLACKWELL
Regional Forester



Date

cc: Robert Duprey - Region 8 USEPA
Jay Pitkin - UDWQ
Peter W. Karp - Uinta National Forest Supervisor
Bob Easton - Pleasant Grove District Ranger
Victor Ketelapper - Region 8 USEPA
Suzanne Buntock - RO, Environmental Engineer

Maggie Manderbach – RO, CERCLA/RCRA
Gary Fremerman – WO, OGC
Ted Fitzgerald – Uinta On-Scene Coordinator

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**American Fork Canyon
Watershed Reclamation Project**

COMMUNITY RELATIONS PLAN

Prepared By: TED V. FITZGERALD
On Scene Coordinator

Edited By: LOYAL CLARK
Public Affairs Specialist

Approved By: 
PETER W. KARP
Forest Supervisor

Date 3/28/00

American Fork Canyon Watershed Reclamation Project

Community Relations Plan

OVERVIEW

The North Fork of American Fork River above Tibble Fork Reservoir has been tested for compliance with the Clean Water Act. The river was found to contain mineral contaminant concentrations at levels that could be hazardous to human health and welfare and damaging to the environment. Plans are being prepared for reclamation of the watershed to reduce the exposure of mineral rich mine waste piles to erosion and leaching resulting in contamination of the stream. The anticipated reclamation could affect some of the current uses the general public practices in the canyon. Some mine waste piles being used by recreational ATV riders will be restricted, evidence of historic mining could be obscured at some sites, and fish habitat in the stream will be improved as the water quality is restored.

Most of the community is unaware of the contamination of the North Fork of American Fork River from historic mining activities, and the increased contaminant levels resulting from some current recreational practices in the canyon. Those aware of the problems associated with the mining deposits, and mine drainage, in American Fork Canyon (AFC) include some Governmental agencies with Clean Water Act responsibilities, academia, and owners/operators of mines. The constant use of the mine tailings piles by ATV users during summer months keeps their surfaces unstable and highly susceptible to erosion. Environmental groups are becoming increasingly concerned with the effects of unrestricted motorized vehicle use on public and private lands. Organized ATV clubs are developing support for responsible riding to reduce impacts to natural resources in an attempt to educate their peers and perpetuate their preferred means of recreation. However, to date neither has addressed the contribution that motorized recreation at the mine sites plays in the contamination of American Fork River.

It is the intent of this plan to raise the awareness level of the community about the hazardous materials in the AFC environment, without creating unwarranted concern and alarm. It also presents procedures to be followed to gain local support for the necessary cleanup actions to bring AFC into compliance with State and Federal laws. The community relations program for watershed restoration efforts in upper AFC solicits the support and cooperation of Utah County officials and the Forest users, in particular, the ATV enthusiasts and anglers that frequent this area.

The Uinta National Forest has the lead responsibility for managing this reclamation effort and will oversee the community relation activities at the site. The plan provides for a series of public announcements, a web page containing pertinent information and schedules, public meetings or open houses, and a procedure to obtain public input.

SITE DESCRIPTION

Historic mining activity in upper American Fork Canyon (AFC) dates back to 1870 and the establishment of the American Fork Mining District. About 250 mining claims were surveyed in the American Fork Mining District in upper AFC. Mining activity peaked in the 1910's but active mining continued into the 1950's. Some mine owners are expressing renewed interest in their patented mining claims. Some National Forest System Lands in AFC were withdrawn from entry for mineral exploration and production in 1966 "for protection of the North Fork of the American Fork Canyon Watershed." (*Federal Register*, Vol. 31, No. 142 – Saturday, July 23, 1966 and Vol. 31, No. 213 – Wednesday, November 2, 1966,.) Nearly 40% of AFC above Mary Ellen Gulch went to patent and remains in private ownership. Mining could still be conducted on those lands and on unencumbered NFS Lands. Currently the principle use of both the public and private lands in AFC is for recreational purposes.

Recent mapping of mine sites in the Mary Ellen Gulch and upper AFC identified over 100 sites where mining activity was extensive enough to create mine adits (most of which have already been closed) and generate waste rock and tailings piles. The sites range in size from a few hundred square feet to 4 acres. At least four of the mines are releasing flows approaching 0.3 cubic feet per second (140 gallons/minute) of water laden with minerals including iron, copper, lead, cadmium, arsenic, and zinc into tributaries of American Fork River.

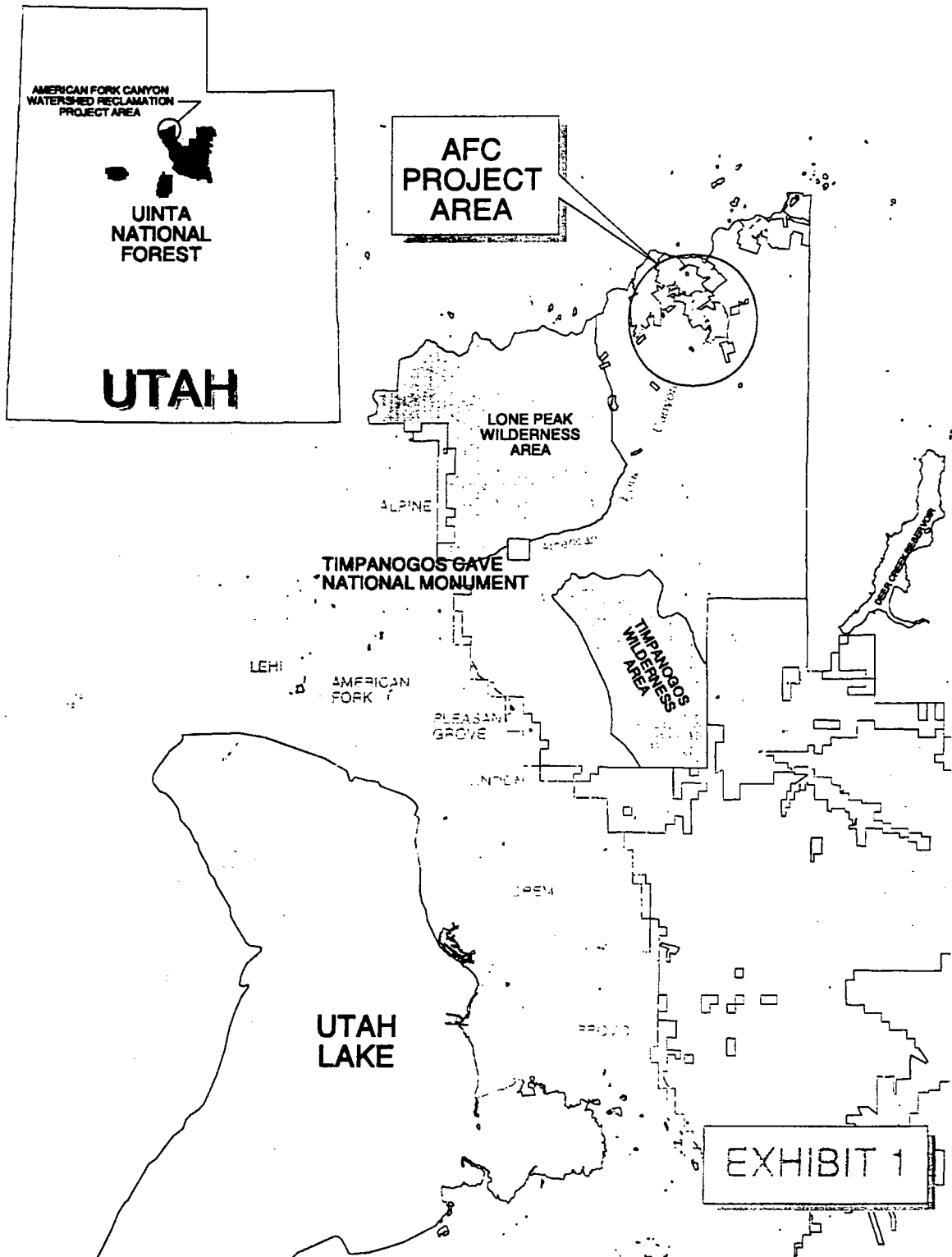
AFC is heavily used by recreationists. Over 1.2 million visitors in 340,000 vehicles passed through the entrance station to the canyon in 1999. The upper reaches of the canyon provide opportunities for hiking, equestrian use, touring, motorized recreation, wildlife viewing, fishing, camping, and a myriad of other outdoor activities. As Wasatch front populations continue to grow more demands are being placed on National Forest resources and visitation to the Forest is expected to increase proportionately.

Some of the public engaged in these activities come in contact with environmental conditions at abandoned mine sites and waste piles that may be hazardous to their health. Dust generated by ATV use on mine tailings contains airborne particles of lead and other hazardous minerals. Streams contain concentrations of minerals exceeding acceptable limits established by the State of Utah. The aquatic habitat is often not conducive to macroinvertebrate populations sufficient to sustain fish and other stream organisms. Bonneville Cutthroat trout (a sensitive species) and Brown trout have been sampled from the river below the mine sites and tested for contamination. Seven of twenty fish sampled were found to have absorbed lead or cadmium into their body tissues at concentration "levels considered hazardous to human health", if eaten. Extended exposure to these contaminants can lead to health problems in human beings.

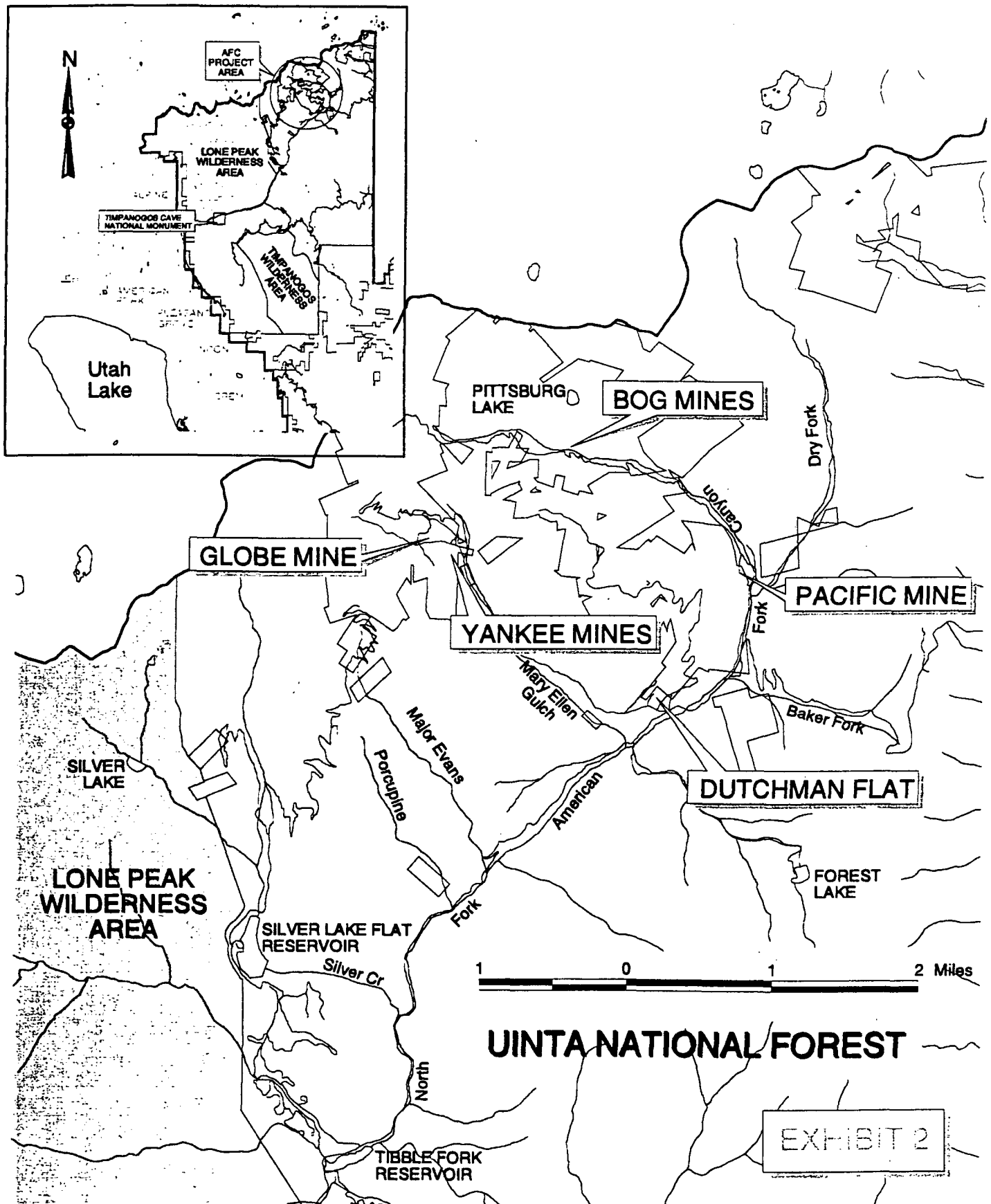
Although laced with patented mining claims (private properties), management of the ecosystem in upper AFC falls primarily to the Pleasant Grove Ranger District of the Uinta National Forest. The District Ranger, working cooperatively with other Federal and State agencies, universities, private enterprises and other partners, will implement reclamation practices at selected mine sites in AFC to improve environmental conditions and water quality in American Fork River and its tributaries.

AMERICAN FORK CANYON WATERSHED RECLAMATION PROJECT

SITE MAP



AMERICAN FORK CANYON WATERSHED RECLAMATION PROJECT PROJECT LOCATION MAP



COMMUNITY BACKGROUND

➤ Community Profile

Settlement of Utah Valley began almost immediately after the arrival of Mormon Pioneers in the mid 1800's. Land suitable for agriculture was plentiful and towns soon dotted the valley floor. Settlers journeyed into the mountains in search of timber for housing and commerce and forage for livestock. Mineral discoveries in mountain canyons occurred regularly. In 1870 the Miller brothers found rich ore deposits in upper AFC. That discovery led to the establishment of the American Fork Mining District and the influx of hundreds of prospectors and miners to the area over the next decade. The District Headquarters was at the settlement of Forest City located at a site now known as Dutchman Flat adjacent to American Fork River at the mouth of Mary Ellen Gulch.

Mining was most active in AFC from 1903 to 1919 and 1925 to 1945. The peak ore production years were 1918 and 1932 with about 12,000 tons and 22,000 tons produced in those years. Nevertheless, the most lucrative period was reported to be between 1871 and 1876 when approximately \$2,500,000 worth of gold, silver, and lead was extracted. That was more than double the value removed from the canyon during any other decade.

Construction of a narrow gauge railroad started in 1871 with intentions of extending it up the canyon to Forest City. That goal was never reached, but it was reported that \$1.7 million was spent by Miller Mining and Smelting Company on the railroad and a smelter at Forest City. In 1907, the roadbed was turned into a toll road and mining companies and other users paid a fee for the right to use the road. This was viewed as an injustice by the miners and the visiting public because the mining companies performed the bulk of the road upkeep. The toll was removed in 1909. The road remains in poor condition today. Four-wheel drive vehicles and ATV's are recommended to access this area.

Although very little mining activity is now occurring in the canyon, large blocks of patented lands remain in private ownership in the upper reaches of AFC. Some patented land has been reacquired by the United States and is now managed by the Forest Service. Several parcels of land have been acquired by Snowbird Ski Resort, or its owners.

Recreation is the predominate use of the canyon and it is expected to grow in popularity as growth continues in Utah Valley. Large numbers of recreationists congregate at the historic mine sites each summer. Some enjoy the experience of visiting the historic sites reflecting on a bygone lifestyle. Others utilize the mine waste piles for ATV and motorcycle riding at a pace similar to a motocross event. Regardless of their preferred recreational activity, the public is adamant about being able to continue recreating on Federal lands. Disputes between user groups are becoming more demonstrative as demands on the area increase.

Today there are several contiguous cities along the base of the mountains north and south of American Fork Canyon. Utah County is the local governmental agency which the Forest Service will collaborate with concerning mining reclamation in AFC. Contacts will be made with local communities and special interest groups based on their level of interest.

➤ Chronology of Community Involvement and Project Awareness

The Uinta National Forest has maintained good working relationships with local County and City representatives. In general these entities have found compatible, and often complimentary positions when dealing with controversial issues.

Prior to development of this Community Relations Plan there has been little contact with local governmental agencies concerning the water issues in American Fork River above Tibble Fork Reservoir. This plan identifies actions to involve local officials and alert the general public, including specific user groups, of the potential hazardous conditions now known to exist in upper AFC and planned clean-up actions.

Recognition of the extent of the problems in upper AFC evolved over time through the efforts of various individuals and agencies. The first official notification of the need to take action at the project site came in 1985 from Ben Albrechtsen, a Forest Service Regional employee. He summarized his field review of Pacific Mine with a recommendation to close the site to off-road vehicles and divert surface flows away from the tailings to prevent additional siltation of American Fork River. He outlined procedures to use in determining the level of contamination resulting from this site. The surface owner of the patent implemented some of the recommended actions but that work was soon made ineffective by continued ATV use at the site.

In 1988, Forest Service officials conducted water, soil, and macroinvertebrate sampling and testing. Those tests confirmed the presence of heavy metals in the tailings and periodic concentrations of lead and zinc in American Fork River and Mary Ellen Gulch which exceed Utah State clean water standards. Mine drainage was flowing from the closed adits at the Lower Bog Mine, Pacific Mine, and Yankee Mines. Macroinvertebrate sampling concluded that these effluents were having severe detrimental effects on their populations and diversity. It was recognized that this would impose a limiting affect on attempts to maintain a fresh water fishery in American Fork River within the reaches affected by mine contaminants.

As the Utah Division of Oil, Gas, and Mining officials worked in the canyon to close mine adits, they observed the conditions at various locations. After consultation with Utah Division of Environmental Response and Remediation officials in 1991, UDERR sent a "discovery form" to the Environmental Protection Agency. EPA listed American Fork Canyon as a "Comprehensive Environmental Response, Compensation, and Liability Inventoried Site" (CERCLIS) on January 24, 1992, based on data provided for the Lower Bog Mine, Pacific Mine, and the Mary Ellen Gulch mines (Yankee mines).

The Forest Service hired a consultant firm (Lidstone and Anderson) to do additional water samples in 1992 after the CERCLIS listing. They confirmed the findings of 1988. The University of Wyoming was enlisted to study the benefits of having the mine drainage "filtered" by a wetlands at Pacific Mine. Nancy Culp, a graduate student, found the vegetative component in the wetlands did significantly reduce the levels of zinc and lead in the water. Subsequent graduate studies by two Utah State Masters Degree candidates have identified the specific plants that are most effective in reducing heavy metals in streams.

The Uinta National Forest completed a Preliminary Assessment of the project site in June 1994. Copies of the report were distributed to the agencies involved, specifically EPA. Additional soil samples were collected that year at the three mine sites. Budgets and personnel were not sufficient at the Forest level for more definitive actions until Bob Gecy was hired as the Forest Hydrologist in November 1996. When Mr. Gecy learned of this project, he submitted budget requests for funding to provide for sufficient data to complete Site Investigations (a CERCLA requirement) at the various mine sites. Some funds came to the Forest in 1998 and 1999 which allowed more samples to be obtained at the three mine sites. As further evaluation of the area progressed, it was considered that the contamination of natural resources may be compounded by other mine sites along the river and even further up on Miller Hill.

This project was rapidly growing in scope and complexity. The Regional Forester and Forest Supervisor agreed to bring in a full time On-Scene Coordinator to expedite and direct the work. Ted Fitzgerald was reassigned as a Regional Office Employee stationed at the Uinta National Forest to assume those responsibilities. He has prepared a program of work, tailored to meet CERCLA standards, that will result in reclamation efforts being completed at the various mine sites by the end of 2002. Monitoring of the sites and streams will continue for a few years thereafter to determine the success of the reclamation efforts. Mr. Fitzgerald will oversee the program of work through completion of reclamation.

➤ Key Community Concerns

Currently community concerns about the contamination of waters in upper AFC is nearly nonexistent. Very few people are aware that a problem even exists. The public does not recognize the historic mining sites as contributing to a potential public health hazard. The bulk of the mining activity occurred before most of the current population was born and there are no known reports of people having suffered adverse health conditions tied to their use of AFC.

As the Community Relations Plan is implemented, the public will become informed of the level of contamination in upper AFC. There may be individuals and organizations that will become more interested and involved as they learn of this situation. As cleanup efforts are implemented at the various mines, additional concerns may surface due to the impact those actions will have on some of the current recreational activities.

The popularity of this area has been enhanced by the abandoned mine sites. The mines provide a focal point for people to congregate. Many people enjoy exploring these sites and reflecting on the way the pioneers of this area lived. Others have found opportunity to camp and picnic at some of the mines because they offer open, relatively flat areas where vehicles and trailers can pull off the road far enough to be free of the dust and noise of other travelers. Some mine sites are very popular riding areas for ATV enthusiasts. These areas provide a riding experience unlike that found on roads and trails; an experience more challenging and thrilling which, for many riders, is becoming more highly valued in light of continually diminishing opportunities.

As reclamation activities occur many of the mine sites will lose the characteristics which attract visitors to those locations. In some cases the evidence of the mining activity may, for the most part, be obliterated as the tailings piles are removed or covered. The areas will be closed to public use as vegetation is reintroduced to the sites and becomes established. ATV use of the areas will probably be prohibited except on specified roads and trails. *(That has been the prescription for motorized use of this area under the Forest Travel Plan for several years. As this area undergoes reclamation, the travel restrictions will be more aggressively enforced to protect the large capital investments represented by the reclamation.)*

There are individuals and groups that may object to what they perceive as an attempt to impose even further restrictions on their use of Federal lands resulting from the cleanup efforts that will occur in AFC. Conflicts between user groups may be aggravated as ATV use is diverted off the mine sites and concentrated more on roads and trails designated "open" to ATV use. Projection of ATV use in the canyon, after completion of this project, is that it will continue to grow in popularity even though there will be fewer places for people to ride. This scenario presents land managers with a potential dilemma because some people are already complaining to the Forest Service about ATV use in the canyon. Developing a responsible rider ethic among all ATV users, coupled with law enforcement, may be the only way to prevent greater restrictions.

HIGHLIGHTS OF THE PLAN

The community relations program for upper American Fork Canyon is intended to allow Forest users and adjacent communities to learn about and participate in the cleanup effort, without unduly alarming the community about present potential hazards. To be effective, the community relations program must present the project in the light of "a real need to take action" for the benefit of the environment and Forest users, recognizing the impacts it will impose on certain recreational and historic values.

The community relations program provides the following approaches:

1. Enlist the support and participation of local officials in coordinating community relations activities. Appropriate officials to involve in the community relations program include the Utah County Commissioners; Mayors and City Councils of American Fork, Lehi, Alpine, Pleasant Grove, Lindon, Orem, and Provo; and District Health Department officials. To enlist the support of these officials an orientation meeting will be requested by the Forest Service with the Utah Valley Council of Governments and health departments. Regular updates of community reaction and progress with the project will follow.
2. Contact Federal and State Elected Officials. Send letters outlining the project and offer to meet with Congressional representatives at both the Federal and State levels. The letters need to reach these officials at the same time County and Local officials are notified. This will be done prior to providing information to the general public.

3. Advise the general public of the project. Media releases will present factual information about the conditions that exist in upper AFC and the timeframe in which cleanup actions will occur. These releases will be designed to emphasize the seriousness of the situation and the potential impacts to current practices in the canyon. They will identify ways in which the public can provide input to the project.
4. Contact Special Interest Organizations. Send letters outlining the project to organized groups that have shown interest in Forest Service actions or requested they be informed of new projects or proposals. Provide them with the opportunity to comment on the project or otherwise become engaged.
5. Install Information Signs at the Project Location. Signs alerting the public of the situation in AFC will be installed up canyon from Tibble Fork Reservoir at a turnout in the road. Other signs will be placed at key locations in the canyon adjacent to sites subject to reclamation in the future.
6. Let the people "set the pace" for the community relations program. After the initial announcement of this project to governmental officials and the public, the forest Service will monitor the reaction and response to the project. Determine the need for additional contact, either by the Forest Service or by other local officials. Determine if public meetings are warranted. Do not be overly aggressive in trying to generate interest in this project. Provide the public the opportunity to get involved and respond according to their level of interest.

TECHNIQUES AND TIMING

- Upon approval of the Community Relations Plan by the Forest Supervisor prepare letters to local, State, and federal leaders. Arrange a time to meet with the County Commissioners at their regularly scheduled commission meeting or at a Utah Valley Council of Governments meeting. *(These actions should be completed in March 2000.)*
- After meeting with the County Commission arrange a meeting with the District Health Department and present them with a package of information detailing the level of contamination known to exist in the tailings and waters in upper AFC. Request their assistance in identifying means of treating the sites, inform them of the proposed timetable for the project and planned "Time Critical Removal Actions", and invite their involvement in the project. *(This should be done in March 2000.)*
- Prepare media releases and letters to organized groups alerting the public to the project. Send out those messages after consulting with the District Health Department. Identify a contact point and person for responses from the public. *(Schedule this action for late March or early April 2000.)*

- Establish and maintain information repositories. Fact sheets, technical summaries, site reports (including the community relations plan), and information on the CERCLA process for reclamation projects will be placed in the information repositories. Paper copies of the information will be located at the Pleasant Grove Ranger District Office and the Forest Supervisor's office in Provo. The information will also be available on an Internet site accessible to the public via computer. *(This data will be available in mid April 2000 and will be updated as new information becomes available.)*
- Purchase interpretive signs explaining the need for the project, the environmental conditions associated with the mine sites and streams, and the plans to perform reclamation at various sites in the canyon. Identify the Forest Service contact for public comment. *(Install those signs as soon as reasonable access to the canyon develops in the spring of 2000.)*
- Monitor the progress of the project and provide officials with regular updates and progress reports. Keep the lines of communication open to all who desire to be informed of the project and specifically with County officials. *(Implement as warranted.)*

ADDITIONAL INFORMATION AND PUBLIC RESPONSE

Additional information about this project can be obtained from the following Forest Service sources. Public response to the project is welcomed.

- Ted V. Fitzgerald, On-Scene Coordinator
 Uinta National Forest Supervisor's Office
 88 West 100 North
 Provo, Utah 84601
 Phone 801 342-5171
 Email: afcproject@fs.fed.us
- Bob Easton, District Ranger
 Pleasant Grove Ranger district
 390 North 100 East
 Pleasant Grove, Utah 84062
 Phone 801 342-5241

Information repositories for this project are open for public review at the addresses above or that information can be viewed On-Line at Internet address www.fs.fed.us/r4/uinta in the "AFC Watershed Reclamation Project" link.

TABBED PAGE



United States
Department of
Agriculture

Forest
Service

Intermountain
Region

324 25th Street
Ogden, UT 84401-2310

File Code: 2160

Date: May 17, 2000

Mr. Brad Johnson, Manager
Utah Department of Environmental Quality
Division of Environmental Response and
Remediation
168 North 1950 West
Salt Lake City, UT 84114-4810

CERTIFIED – RETURN RECEIPT
REQUESTED

Dear Mr. Johnson:

The USDA-Forest Service (FS) is initiating response actions in the American Fork Canyon (Sites) pursuant to its authorities under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), (42 U.S.C.9601 et seq.); federal Executive Order 12580, and 7 C.F.R. 2.60 (a)(40). The Sites are located on or are affecting National Forest System lands under the jurisdiction of the Uinta National Forest. These sites are located in the north fork of the canyon. The suspected hazardous substances on site are wastes from the beneficiation, processing, and extraction of ores, and are therefore exempt from regulation through the Resource Conservation and Recovery Act (42 U.S.C. 6901, 6921(b)(3)(ii).

To be consistent with the National Oil and Hazardous Substance National Contingency Plan (NCP), the lead agency (in this case the FS) must request of the appropriate state its Applicable or Relevant and Appropriate Requirements (ARARs) and states are responsible for identifying the same (see 40 CFR 300.525(d)). Consistent with 40 CFR 300.415(j) these ARARs will be complied with to the extent practical in any "removal" action alternative ultimately selected by the FS. We request that your office (or other Utah agencies as appropriate) identify potential chemical, location, and action specific ARARs for the Sites. Please advise us of other provisions that should be considered (TBCs).

We plan an aggressive schedule in implementing this CERCLA removal due to the concern of the hazardous substances being released into the environment and the contamination of fish which are in turn being consumed by the public. We would appreciate a timely response so that we may fully address Utah's environmental concerns at this site. However, if we do not receive Utah's identification of ARARs within 30 working days of receipt of this letter (see generally, 40 CFR 515 (h)(2)) the FS will identify those ARARs it deems appropriate.

We look forward to working in partnership with the State of Utah in addressing our mutual environmental concerns at this site. Ted Fitzgerald has been designated as On Scene Coordinator and as spokesperson for this project. Please contact Mr. Fitzgerald at (801) 342-5171 with any questions.

Sincerely,

/s/ Roland M. Stoleson for

JACK A. BLACKWELL
Regional Forester





State of Utah

DEPARTMENT OF ENVIRONMENTAL QUALITY DIVISION OF ENVIRONMENTAL RESPONSE AND REMEDIATION

Michael O. Leavitt
Governor

Dianne R. Nielson, Ph.D.
Executive Director

Kent P. Gray
Director

168 North 1950 West
P.O. Box 144840
Salt Lake City, Utah 84114-4840
(801) 536-4100
(801) 359-8853 Fax
(801) 536-4414 T.D.D.
www.deq.state.ut.us Web

ERRC-163-00

July 5, 2000

Mr. Jack A. Blackwell, Regional Forester
United States Department of Agriculture
Forest Service
Intermountain Region
Federal Building, 324 25th Street
Odgen, Utah 84401-2310

Dear Mr. Blackwell:

We received your letter of May 17, 2000 regarding response actions that the Forest Service plans to initiate at sites in American Fork Canyon pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Your letter requests that the Utah Department of Environmental Quality (UDEQ) identify State applicable or relevant and appropriate requirements (ARARs). Please find enclosed a table which lists potential ARARs for the activities that will be conducted by the Forest Service. There are three points I would like to clarify regarding compliance with ARARs:

1. Since potential alternatives to address all the environmental problems in the canyon have not yet been developed, it is difficult at this time to define exactly which regulatory standards will be ARARs. The requirements presented in the attached table are commonly identified as being applicable or relevant and appropriate at sites where removal or remedial actions under CERCLA are conducted. As more information becomes available about the nature of the contamination and potential alternatives to address it, the identification of ARARs can be refined.
2. Your letter indicates that the suspected hazardous substances on site are wastes from the beneficiation, processing, and extraction of ores, and are therefore exempt from regulation under the Resource Conservation and Recovery Act (RCRA). However, insufficient information has been provided for us to agree that a proper determination of the regulatory status of the waste material has been made. The exemption cited in your letter, commonly known as the Bevill exemption, is narrowly applied to solid wastes based on the criteria of 40 CFR 261.4(b)(7). In

order to verify that the exemption applies to the wastes in American Fork Canyon, the Forest Service will have to document that the waste materials at each site are included among the solid wastes listed in 40 CFR 261.4(b)(7)(ii), and that the processes involved in generating the wastes are restricted to the activities described in 40 CFR 261.4(b)(7)(i). This may be difficult to do if there is only limited information available on how the wastes were generated. The Forest Service should also evaluate the sites sufficiently to determine whether past activities have resulted in the presence of other types of hazardous substances besides those related to ores and minerals. For example, any evidence of buried tanks, electrical transformers, or other types of waste disposal should also be investigated.

3. Your letter indicates that the National Contingency Plan requires that ARARs be met to the extent practicable for CERCLA removal actions (40 CFR 300.415(i)). However, this does not mean that ARARs only need to be met if it is convenient to do so. The NCP clarifies that the criteria for determining whether compliance with ARARs is practicable include the urgency of the situation and the scope of the removal action to be conducted. Urgency may be a factor in complying with ARARs when a time-critical removal action must be done to stabilize a site quickly in order to protect human health or the environment. The scope of the action relates to removal objectives. Often, the objective of a removal action is to address a particular problem at a site where a more comprehensive remediation will eventually be implemented. If this is the case, then there may be some ARARs relating to the comprehensive cleanup that would not be practicable for the removal action because of its limited scope. For example, compliance with ARARs for ground water restoration may not be within the scope of a removal action that focuses only on source removal, but it is assumed that ground water will eventually be addressed through the remedial process. If the objective of a removal action is to implement a final overall cleanup of a site, then it is difficult to justify that any ARARs are not practicable.

If you have any questions or concerns regarding the enclosed table of potential ARARs or the issues discussed above, please contact me at (801) 536-4172.

Sincerely,



Duane Mortensen, Federal Facilities Section Manager
Division of Environmental Response and Remediation

DM/np

Enclosure(s)

cc: Suzanne Buntrock, P. E., USDA Forest Service

CHEMICAL SPECIFIC ARARS

Standard, Requirement, Criteria, or Limitation	Citation	Description	Comments
Utah Safe Drinking Water Act - Title 19 UCA Chapter 4			
Utah Primary Drinking Water Standards	UAC R309-103-2	Establishes maximum contaminant levels for inorganic and organic chemicals as primary drinking water standards.	Requirements are relevant and appropriate for contaminated ground water.
Utah Water Quality Act - Title 19 UCA Chapter 5			
Ground Water Quality Protection Rule	UAC R317-6	Establishes ground water quality standards (R317-6-2).	Ground water quality standards are applicable to restoration of contaminated ground water and are the same as MCLs with few exceptions (e.g., lead and copper).
Water Quality Standards	UAC R317-2	Establishes standards for the quality of surface waters of the State. R317-2-6 defines use designations. R317-2-7 (Water Quality Standards) requires compliance with surface water numeric criteria. R317-2-13 classifies waters of the State. R317-2-14 provides numeric standards for water classes.	American Fork Creek from the diversion at the mouth of the canyon to the headwaters has use designations as follows: Class 2B, Class 3A and Class 4. The numeric standards for these classes are provided in R317-2-14.

ACTION SPECIFIC ARARS

Standard, Requirement, Criteria or Limitation	Citation	Description	Comments
UCA 73-3-25			
Well Drilling Standards	UAC R655-4	Establishes standards for drilling and abandonment of wells.	Requirements are applicable for installing or abandoning wells.
Utah Air Conservation Act - Title 19 UCA Chapter 2			
General Requirements for Air Conservation	UAC R307-101	Outlines general requirements.	Compliance with National Ambient Air Quality Standards (NAAQS) required. Definitions for Air Conservation rules provided.
Davis, Salt Lake and Utah Counties, Ogden City and any non-attainment area for PM10: Fugitive Emissions and Fugitive dust.	UAC R307-309	Specifies requirements for fugitive dust control in Utah County.	This requirement is applicable to activities that could result in the emission of fugitive dust (e.g, construction, excavation, and road grading).
Conditions for Issuing Approval Orders	UAC R307-401-6	Requirements for implementation of Best Available Control Technology (BACT) and compliance with National Primary and Secondary Ambient Air Quality Standards.	These requirements are applicable to air emissions, including emissions from any waste treatment systems. NAAQS for PM10 is 50 ug/m ³ annual arithmetic mean, and 150 ug/m ³ 24 hour maximum. NAAQS for lead is 1.5 ug/m ³ maximum quarterly average.
Emission Impact Analysis	UAC R307-410	An evaluation of ambient air impacts related to toxic air pollutants is required. The rule defines procedures for developing toxic screening levels for air pollutants.	These requirements are applicable for potential air emissions, including those from waste treatment processes.
Utah Solid and Hazardous Waste Act - Title 19 UCA Chapter 6 Part 1			
Definitions and General Requirements for Solid and Hazardous Waste	UAC R315-1 and R315-2	Outlines general requirements and provides definitions for Utah Solid and Hazardous Waste rules.	General rules and definitions will be applicable to management of generated hazardous wastes.
Hazardous Waste Generator Requirements	UAC R315-5	Outlines requirements for hazardous waste generators. State analog to 40 CFR Part 262.	Requirements would be applicable for hazardous waste generated as a result of clean-up activities.

Standards for Owners and operators of Treatment, Storage and Disposal Facilities.	UAC R315-8	Outlines requirements for hazardous waste treatment, storage and disposal facilities (TSDFs). State analog to 40 CFR Part 264	The substantive portions of this rule could be ARARs for alternatives where remediation wastes are managed on-site. Specific citations from this rule are shown below.
General Facility Standards: Location Standards for Hazardous Waste Facilities	UAC R315-8-2.9	Establishes site characteristics which are unsuitable for location of hazardous waste management units. State analog to 40 CFR 264.18.	Requirements are applicable for generated hazardous wastes where on-site treatment, storage or disposal occurs. Requirements are relevant and appropriate where remediation wastes are managed in an area of contamination (AOC) or corrective action management unit (CAMU), or for Bevill exempt wastes.
General Facility Standards: Construction Quality Assurance Program	UAC R315-8-2.10	Establishes requirements for a construction quality assurance program to ensure that constructed units meet or exceed all design criteria.	See remarks for UAC R315-8-2.9.
Ground Water Protection	UAC R315-8-6	Describes ground water monitoring requirements and protection standards for TSDFs. State analog to 40 CFR 264 Subpart F.	See remarks for UAC R315-8-2.9.
Closure/Post Closure Standards	UAC R315-8-7	Establishes closure and post closure performance standards for TSDFs. State analog to 40 CFR 264 Subpart G.	See remarks for UAC R315-8-2.9. Where the closure and post closure standards are applicable either clean closure or landfill closure is required. Where the requirements are relevant and appropriate hybrid closures (either clean or landfill) are also possible. (See RCRA ARARs: Focus on Closure Requirements, OSWER Directive 9234.2-04FS.)
Use and Management of Containers.	UAC R315-8-9	Establishes standards for management of hazardous waste in containers. State analog to 40 CFR 264 Subpart I	These requirements would be ARARs where waste materials are stored in containers.
Tanks	UAC R315-8-10	Establishes standards for management of hazardous waste in tanks. State analog to 40 CFR 264 Subpart J	These requirements would be ARARs where wastes are stored or treated in tanks.
Waste Piles	UAC R315-8-12	Establishes standards for storage of hazardous waste in waste piles. State analog to 40 CFR 264 Subpart L.	These requirements would be ARARs where hazardous wastes are stored in piles.

Landfills	UAC R315-8-14	Establishes standards for landfill closure of hazardous waste. State analog to 40 CFR Subpart N.	Please see remarks for UAC R315-8-7.
Corrective Action Management Units (CAMUs) and Temporary Units	UAC R315-8-21	Establishes requirements for designation of a CAMU and defines management practices. State analog to 40 CFR 264 Subpart S.	<p>The CAMU concept is similar to the AOC, but provides more flexibility than an AOC in complying with LDRs and closure/post closure standards. The main differences between CAMUs and the AOC policy are that when a CAMU is used, wastes may be treated ex situ and then placed in a CAMU, CAMUs may be located in uncontaminated areas at a facility, and wastes may be consolidated in CAMUs from areas that are not contiguously contaminated. None of these activities are allowed under the AOC policy, which covers only consolidation and in situ management techniques carried out within an AOC.</p> <p>A new CAMU rule is scheduled to be proposed by EPA late in the summer of 2000. Therefore, the ability to use the current rule with respect to future activities in American Fork Canyon is uncertain.</p>
Staging Piles	40 CFR 264.554	Federal rule which establishes requirements for managing remediation wastes in staging piles	This rule might be useful in staging remediation wastes in piles during clean-up activities.
Emergency Controls	UAC R315-9	Outlines requirements for emergency controls of hazardous waste spills.	The rule specifies requirements for immediate action, cleanup and reporting for hazardous waste spills. The requirements would be applicable for any on-site hazardous waste spills during cleanup activities.
Land Disposal Restrictions	UAC R315-13	Outlines land disposal restrictions for hazardous waste. State analog to 40 CFR Part 268.	LDR Phase IV standards apply to hazardous remediation wastes that are land disposed. (See 40 CFR 268.49.) However, if wastes are managed according to requirements for AOCs or CAMUs, land disposal does not occur.

Clean-up Action and Risk-Based Closure Standard	UAC R315-101	This rule establishes risk-based closure standards for management of sites contaminated with hazardous waste or hazardous constituents.	The rule allows closure of facilities to risk based standards. It requires appropriate site management for facilities based on identified levels of risk. Appropriate site management may include corrective action, monitoring, post closure care, institutional controls and site security. The rule is applicable to management of hazardous waste, but could be relevant and appropriate where waste material is Bevill exempt.
Corrective Action Cleanup Standards Policy - CERCLA and Underground Storage Tank (UST) sites	UAC R311-211	The rule addresses cleanup requirements at CERCLA and UST sites.	The clean-up strategy must achieve compliance with the policy. The policy is an applicable requirement that sets forth criteria for establishing clean-up standards and requires source control or removal, and prevention of further degradation.
Utah Water Quality Act - Title 19 UCA Chapter 5			
Definitions and General Requirements	UAC R317-1	Provides definitions and general requirements for water quality in the State.	The provisions of the rule are ARARs for activities involving surface or ground water.
Ground Water Quality Protection Rule	UAC R317-6	Standards for protection of ground water. Establishes ground water classes (R317-6-3) and associated levels of protection (R317-6-4).	Ground water class protection levels apply to facilities that discharge or would probably discharge to ground water. Remedies should be designed so that wastes left in place will not result in any discharge to ground water in excess of protection levels.
Utah Pollutant Discharge Elimination System Requirements	UAC R317-8	Establishes general requirements, definitions, and criteria/standards for technology-based treatment for point sources and provides pre-treatment requirements for discharge to a publicly-owned treatment works (POTW). It also establishes requirements for storm water runoff.	The UPDES requirements would be applicable to any point source discharges to a surface water body (e.g., American Fork Creek).



United States
Department of
Agriculture

Forest
Service

Uinta National Forest

88 West 100 North
P.O. Box 1428
Provo, UT 84603-1428

File Code: 2160

Date: March 14, 2000

Dwight Hill
Utah County Health Department
589 South State Street
Provo, Utah 84606

Jay Pitkin
Utah Division of Water Quality
288 N 1460 W
Salt Lake City, Utah 84116-0690

Gentlemen:

This letter documents a meeting on March 7, 2000, where representatives of the Forest Service presented water quality, air quality, and heavy metal concentrations in resident fish data collected in the North Fork of American Fork River. Attendance at the meeting included:

- o Dave Wham - Utah Division of Water Quality
- o Dave Johnson- Utah County Environmental Health
- o Doug Sakaguchi - Utah Division of Wildlife Resources
- o Charlie Thompson – Utah Division of Wildlife Resources
- o Bob Gecy – Uinta National Forest
- o Dave Fogle – Uinta National Forest
- o Ted Fitzgerald – Intermountain Region, Forest Service

We request that your agency examine the data that was presented and determine the significance of that information pertaining to public health and welfare. A coordinated response by all the agencies involved may be warranted if this data represents potential hazards to the public. Please advise us of the response you consider appropriate so proper actions can be implemented in a timely manner.

Your interest and consideration of this request will be appreciated. We look forward to participating in a cooperative effort between agencies to provide the appropriate level of protection to the many people who recreate in American Fork Canyon. A reply to this request by April 14, 2000, should allow sufficient time for implementation of appropriate responses at the beginning of the 2000 summer recreation season.

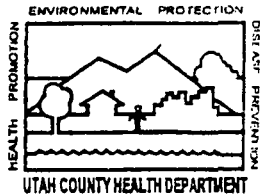
Sincerely,

s/Peter W. Karp

PETER W. KARP
Forest Supervisor

cc: UDWR, 1115 N Main, Springville, Utah 84663
Regional Forester





589 South State Street
Provo, Utah 84606-5056

"creating healthy communities"

Joseph K. Miner, M.D., M.S.P.H.
Executive Director

DIVISION OF ENVIRONMENTAL HEALTH
Phone (801) 370-4525 • Fax (801) 370-4521
Dwight C. Hill, E.H.S. Director

May 1, 2000

United States Department of Agriculture
Uinta National Forest
Attn: Ted Fitzgerald
88 West 100 North
P.O. Box 1428
Provo, Utah 84603-1428

Dear Mr. Fitzgerald:

We have been asked to respond to concerns raised by the Uinta National Forest at a meeting held on March 7, 2000 regarding the potential health hazards associated with mine waste contamination of water and air in the north fork of American Fork Canyon.

The data presented on fish sampling in the north fork shows heavy metal contamination principally of arsenic, lead, and zinc. There were also, exceedences of other heavy metals that do not meet State standards for Class 3A Cold Water Fisheries.

Nine of twenty fish tissue samples were unsatisfactory. We understand these samples were taken from resident fish populations, primarily German Brown trout above Tibble Fork Reservoir. One positive trout sample was apparently identified below Tibble Fork Reservoir however. Regarding the consumption of fish in the north fork drainage, we would recommend the following:

1. Advise against the keeping for consumption of German Brown and Cutthroat trout. We would also recommend that the State Division of Wildlife Resources conduct testing of the resident fish populations in Tibble Fork Reservoir to determine contamination levels that may be present.
2. Concerning the Pacific Mine tailings, we would recommend posting and/or fencing the area to exclude recreational ORV riders from further disturbing the site. We would also recommend posting other potentially hazardous mine tailing sites in the north fork to help prevent airborne dust from further contaminating the air and water near these sites.

We hope this statement of our position will be of use to you. We look forward to working with you in a cooperative fashion to both protect the public health and to prevent further environmental damage due to mining wastes in the north fork of American Fork Canyon.

If we can be of further assistance, please feel free to contact this office.

Sincerely,

Dave Johnson
Bureau Director
Environmental Health Services

DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF WATER QUALITY

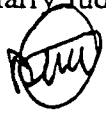
Michael O. Leavitt
Governor

Dianne R. Nielson, Ph.D.
Executive Director

Don A. Ostler, P.E.
Director

MEMORANDUM

TO: Jay Pitkin, Harry Judd

FROM: Dave Wham 

DATE: June 16, 2000

SUBJECT: Analysis of Fish Tissue Data from the North Fork American Fork Canyon

Background

As part of a intensive monitoring program to assess the potential impacts from abandoned mining operations in American Fork Canyon, personnel from the Uinta National Forest obtained fish tissue samples from the following 5 sites in the North Fork of American Fork Creek in 1999: North Fork below Tibble Fork, North Fork above Tibble Fork, North Fork above confluence with Major Evans Gulch; North Fork between Pacific Mine and Dutchman Flat, and North Fork above Pacific Mine (see attached map). Four fish were collected at each site. Brown and Cutthroat trout were selected for collection because they are a naturally reproducing species in the creek and would have the highest potential for long term exposure to contaminants. While rainbow trout are also found in the creek, the Division of Wildlife Resources had indicated that the population of this species is primarily a put-and-take fishery resulting from their annual stocking program.

Muscle tissue samples from the collected fish were analyzed for 21 metals by the Utah State University Toxicology Lab. Results of the analysis are attached. The Uinta National Forest conducted a preliminary screening of the results, and identified several tissue samples with potentially concerning lead and arsenic values.

Findings

Arsenic

In reviewing the arsenic criteria, it became apparent that there is a distinction between the organic and inorganic forms. EPA (1995) indicated that most of the arsenic present in fish and shellfish tissue is organic arsenic. They cited numerous studies that found this form of arsenic to be metabolically inert and nontoxic. EPA noted that inorganic arsenic, which is of concern for human health effects, is generally found in seafood in concentrations ranging from < 1 to 20 percent of the total arsenic concentration. EPA recommended that in both screening and intensive studies, total

Memorandum
June 16, 2000
Page 2

inorganic arsenic be used for comparison against standards. They stated that this approach is more rigorous than the current FDA procedure of analyzing for total arsenic and estimating inorganic arsenic concentration based on the assumption that 10 percent of the total arsenic in fish tissue is in the inorganic form. After discussing this issue with Forest Service Hydrologist Bob Gecy, I contacted Dr. Jeff Hall, the USU investigator who performed the tissue analysis on the North Fork fish. He indicated that the arsenic data were obtained by a total acid digestion procedure and represented total As.

In the absence of total inorganic arsenic values, I have applied the FDA's 10 % total-As:inorganic-As rule of thumb to the North Fork fish tissue data in order to compare it to existing criteria. The following values all reflect this conversion.

Arsenic values in collected fish tissue ranged from 0.0079 to 0.0688 mg/kg. Average concentrations of the four fish sampled at each site are depicted in Figure 1. Two stations, North Fork above Tibble and North Fork below Tibble, showed the highest average values, with concentrations approximately 2 - 2 1/2 times those found at the other 3 sites.

EPA (1997) has developed monthly consumption limits for inorganic arsenic. Assuming a 8-oz meal size for adults and a 4-oz meal size for children, the level of concern is 0.09 mg/kg and 0.1 mg/kg respectively. For levels higher than these values, EPA begins to advise consumption limits less than 30 meals per month. All fish tissue sampled had arsenic concentrations below these levels. Based on this information, it appears that while arsenic levels are elevated in the drainage, concentrations are below the threshold level of concern for human consumption. Analysis of additional fish tissue samples for inorganic arsenic would help remove some uncertainty related to the issue of organic/inorganic arsenic.

Lead

Lead is particularly toxic to children and fetuses. It appears that some of the subtle neurobehavioral effects (e.g., fine motor dysfunction, impaired concept formation, and altered behavior profile) particularly changes in the levels of certain blood enzymes and in aspects of children's neurobehavioral development, may occur at blood levels so low as to be essentially without a threshold (EPA, 1995)(Manno, 1995)(Lee and Taylor, 1997). The EPA's (1995) Reference Dose (RfD) Work Group discussed inorganic lead (and lead compounds) in 1985 and considered it inappropriate to develop an RfD for inorganic lead.

Because of the lack of quantitative health risk assessment information for oral exposure to inorganic lead, the EPA Office of Water has not included lead as a recommended target analyte in fish and shellfish contaminant monitoring programs at this time (EPA, 1995). EPA notes that because of the observation of virtually no-threshold neurobehavioral development effects of lead in children, states should include lead as a target analyte in fish and shellfish contaminant programs if there is any evidence that this metal may be present at detectable levels in fish or shellfish tissue.

Eisler (1988) indicated that Pb concentrations in edible tissues exceeding 0.3 mg/kg fresh weight were at a level considered hazardous to human health.

The U.S. Food and Drug Administration (1993) developed a provisional tolerable total intake level (PTTIL) using information on the lowest levels of lead exposure associated with adverse effects (i.e., neurobehavioral and cognitive development). The recommended PTTILs are 6 ug/day for children up to the age of 6 years, 15 ug/d for children 7 years of age and older, 25 ug/day for pregnant woman and 75 ug/day for adults. These intake levels were developed to be applied to short term and chronic exposures. The FDA stressed that when assessing the hazard and risk of lead from any source, it is imperative that this analysis be done with the understanding that lead exposure for any population occurs from a number of sources which vary in degree and level of risk.

Lambert (1998) summarized a number of states' approaches and target levels for fish consumption advisories. She cited the Ohio Department of Health (1997) as developing the following advisory protocol for lead. I have not yet been able to obtain the original Ohio document.

Assumptions:

- Provisional Total Tolerable Daily Intake (PTTD) = 6 ug/d. This is the FDA's (1993) provisional tolerable intake level (PTTIL) for children up to the age of 6 years
- Average Meal = 113.4 grams/4 ounces (uncooked fish)
- Representative target consumer is a child, 0-6 years in age.

<u>Type of Advisory</u>	<u>Concentration (mg/kg)</u>
one meal per month	0.373 - 1.069
One meal /Week	0.087 - 0.372
Unrestricted	0 - 0.086

The Agency for Toxic Substances and Disease Registry (Cox, 1997) has developed a screening or guidance value for lead in fish tissue of 0.3 mg/kg. This value was developed as part of a study of bioaccumulation of potentially hazardous chemicals in Putah Creek fish and other aquatic life near the University of California, Davis Department of Energy Laboratory for Energy-Related Health Research (LEHR) National Superfund site. This value is based on a comparison between the consumption of drinking water at the U.S. EPA action level of 15 µg/L, assuming 2 L/day consumption, and the consumption of fish, assuming a 50 g/day consumption rate.

Lee and Taylor (1997) noted that the 50 g/day consumption rate is somewhat above the values typically used by the U.S. EPA of 6.5 g/day and 30 g/day, i.e. one meal per month or one meal per week, respectively. It is on the order of two meals per week. They stressed that it is important to understand that the 15 µg/L lead drinking water action level is not necessarily a safe concentration. The U.S. EPA in developing that level recommended that the concentration be kept as low as

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possible. The authors concluded that any time the concentrations of lead in fish tissue used for human food are above about 0.3 mg/kg, there should be concern for children making extensive use of these fish as food.

Lead values in American Fork fish tissue ranged from 0.032 to 0.824 mg/kg. Average concentrations of the four fish sampled at each site are depicted in Figure 1. Six fish tissue samples exceeded the 0.3 mg/kg value for lead. All four samples at the station between Pacific Mine and Dutchman Flat, and one sample each at North Fork above Tibble and North fork below Tibble exceeded the criteria. The station between Pacific Mine and Dutchman flat showed an average value of 0.671 mg/kg, over double the 0.3 mg/kg level of concern and 2 1/2 to 6 times the concentrations found at the other 4 sites. The average of the 4 fish collected at the above Tibble Fork (0.194 mg/kg) and below Tibble Fork (0.179 mg/kg) sites did not exceed the 0.3 mg/kg level.

Based on the no-threshold developmental effects of lead in children and the exceedence of published levels of concern, I recommend that the Division, in conjunction with the Forest Service, Utah County Health Department, Division of Wildlife Resources and Department of Health, issue a fish advisory against the consumption of Brown and Cutthroat trout for the North Fork of American Fork Creek from above Tibble Fork Reservoir to the Pacific Mine. As indicated above, EPA has not developed concentration-based monthly consumption limits for lead in fish tissue. I have forwarded pertinent information to Mr. Wayne Ball, Manager of Environmental Epidemiology for the Utah Department of Health for consultation on potential human health risks and determination of allowable fish consumption rates. The Department of Health's analysis should help us craft an appropriate advisory. Because of the relatively high utilization of Tibble Fork Reservoir as a fishery, I also recommend that fish tissue samples be collected from the reservoir.

References

- Cox, C. A. 1997. Concentrations of Selected Radionuclides and Chemicals in Fish, Sediment, and Water Collected From the Putah Creek Near the Former Laboratory for Energy-Related Health Research, Davis, CA; Report for Agency for Toxic Substances and Registry by the National Air and Radiation Environmental Laboratory, U.S. Environmental Protection Agency/NAREL, Montgomery, AL.
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- EPA, 1997. Guidance for Assessing Chemical Contaminant Data for use in Fish Advisories, Volume II, Risk Assessment and Fish Consumption Limits, Second Edition, EPA 823-B-97-009.
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- Lambert, L., 1998. Lake Erie Lakewide Management Plan (LaMP) Technical Report Series - Impairment Assessment of Beneficial Uses: Restrictions on Fish and Wildlife Consumption. Lake Erie LaMP Technical Report No. 2.
- Lee, F.G. and Taylor, S. 1997. Review of Existing Water Quality Characteristics of Upper Newport Bay, Orange County, CA and its Watershed, Report, G. Fred Lee and Associates, El Macero, CA; http://home.pacbell.net/gfredlee/unb_wq.htm
- Manno, J., D. Riedel, and N. Trembley. August 1995. Effects of Great Lakes Basin Environmental Contaminants on Human Health. SOLEC Working Paper presented at State of the Great Lakes Ecosystem Conference. EPA 905-R-95-013. Chicago, Ill.: U.S. Environmental Protection Agency.
- U.S. Food and Drug Administration. 1993. Guidance Document for Lead in Shellfish. Center for Food Safety & Applied Nutrition, Washington D.C.



United States
Department of
Agriculture

Forest
Service

Uinta National Forest

88 West 100 North
P.O. Box 1428
Provo, UT 84603-1428

File Code: 2160

Date: March 28, 2000

Dear Forest User:

Uinta National Forest officials are working with other agencies and private land owners to reduce continued contamination of the North Fork of American Fork River from heavy metals being released at mine and mill sites in the historic American Fork Mining District. The contamination was detected in water quality samples, soils information, and fish tissue chemistry collected in the North Fork of American Fork Canyon above Tibble Fork Reservoir.

There are periods each year when the river contains lead, zinc, cadmium, and other metals at concentrations which exceed Utah State water quality standards for a Class 3A Cold Water Fishery. Fish samples taken from the stream contain elevated levels of heavy metals. Tailings and waste rock dumps at some of the historic mine and mill sites in the American Fork Mining District contain significantly high concentrations of heavy metals. Inhaling dust generated from those sites may be detrimental to human health. American Fork Canyon was docketed on the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) by the Environmental Protection Agency in 1993.

Plans are being developed to reclaim mine sites known to be contaminating the environment and posing public health concerns. Several of these sites are located entirely on patented mining claims (private property), some are partially private and partially on National Forest System lands, and some are located entirely on National Forest System lands. Our timeline for completing the reclamation at all the problematic sites is October 2002. In the interim we will install signs in the canyon to alert the public to potentially hazardous conditions they could encounter there. We plan to take temporary actions at selected sites to reduce risk to individuals until permanent remedial actions can be implemented. The first of those actions is planned at Pacific Mine to restrict public access to the contaminated site.

Some of the pertinent issues involved in this project are:

- Clean Water Act Compliance
- Human Health and Welfare
- Disturbance of Historic Resources
- Impacts to Current Recreational Practices

Please direct inquiries and comments about this project to Ted Fitzgerald, On-Scene Coordinator, at this address, phone (801) 342-5171. Specific information about the data collected at various sites in the North Fork of American Fork Canyon is available for public review at this office and in the Pleasant Grove District Ranger's office at 390 North 100 East, Pleasant Grove, Utah.

Sincerely,

s/Peter W. Karp

PETER W. KARP, Forest Supervisor





United States
Department of
Agriculture

Forest
Service

Uinta National Forest

88 West 100 North
P.O. Box 1428
Provo, UT 84603-1428

File Code: 2160

Date: February 25, 2000

Dear Elected Official:

Uinta National Forest officials have collected water quality and soils information in the North Fork of American Fork Canyon and determined that portions of the American Fork River and specific mine sites are contaminated with heavy metals. There are periods each year when the river contains Lead, Zinc, Cadmium, and other metals at concentrations which exceed Utah State water quality standards for a Class 3A Cold Water Fishery. Tailings and waste rock dumps at some of the historic mine and smelter sites in the American Fork Mining District contain significantly high concentrations of heavy metals. Inhaling dust generated from those sites may be hazardous to human health. American Fork Canyon was docketed as a Comprehensive Environmental Response, Compensation, and Liability Inventoried Site (CERLIS) by the EPA in 1993.

Plans are being developed to reclaim mine sites known to be contaminating the environment and posing public health concerns. Several of these sites are located entirely on patented mining claims (private property), some are partially private and partially on National Forest System lands, and some are situated entirely on National Forest System lands. Research has been conducted to identify Potentially Responsible Parties (PRP's) at some of the sites. Additional sites will be researched this year. We will be working with viable PRP's to implement reclamation projects.

An introduction to this project will be presented to the Council of Governments (COG) at their March 2, 2000 meeting in Provo, Utah. Forest Service representatives Bob Easton, Loyal Clark, and Ted Fitzgerald will make that presentation. Following the COG meeting, information will be provided to the general public informing them of this proposed activity. Our timeline for completing the reclamation at all the problematic sites is October 2002. In the interim we will alert the public to potentially hazardous conditions they could encounter in the North Fork of American Fork Canyon. We will take interim steps at selected sites to reduce risk to individuals.

Some of the pertinent issues involved in this project are:

- Clean Water Act Compliance
- Human Health and Welfare
- Disturbance of Historic Resources
- Impacts to Current Recreational Practices

Your support of this effort would be appreciated. Please direct inquiries about this project to Ted Fitzgerald, On-Scene Coordinator, at this address, phone 801 342-5171, or I will be happy to visit with you about this matter.

Sincerely,

s/Peter W. Karp

PETER W. KARP
Forest Supervisor





United States
Department of
Agriculture

Forest
Service

Uinta National Forest

88 West 100 North
P.O. Box 1428
Provo, Utah 84603-1428

File Code: 2530-3

Date: February 2, 2000

Utah Division of Water Quality (TMDL)
Dave Wham, Environmental Scientist
P.O. Box 144870
Salt Lake City, Utah 84114-4870

Dear Mr. Wham,

A meeting to review the status of the efforts to clean up the waters in the North Fork of American Fork River was held January 24, 2000, at the Intermountain Regional Forester's Office. The meeting was attended by Dave Wham, UDWQ; Lucy Malin, UDOGM; Bob Gecy, Uinta NF; and Suzanne Buntrock, Maggie Manderbach, and Ted Fitzgerald, Intermountain Region FS.

During the meeting, water quality samples from 1988, 1992, 1998, and 1999 were reviewed. Those water samples were taken to determine the chemical concentrations in the stream resulting from the mining activity which occurred in the American Fork Mining District from 1870 through 1950, with some activity still occurring intermittently on a small scale. The samples were taken at various locations from the North Fork of American Fork River and from tributaries to that stream flowing from historic mine adits and in Mary Ellen Gulch stream. Each time the samples were collected and tested, a series of locations were sampled on specific dates. On each date there were exceedances of various chemicals in the water, with cadmium, lead, and zinc being the most problematic.

Given the water sample history of this stream, the heavy public recreation use in the canyon, and the downstream uses, the representatives at the meeting recognized that these waters warranted evaluation for listing by the State of Utah as 303(d) waters, and if listed, a Total Maximum Daily Load be established for these waters and a State priority given to them. To that end we are providing you with copies of the test results for the water samples, displays showing the lead and the zinc concentrations in 1988 and 1992, Macroinvertebrate data also collected in 1988, and graphs to assist in interpretation of that data. Additional data was collected in 1999 that showed exceedances of lead for the first time below Tibble Fork Reservoir at STORET site 499498.

Please keep us informed of your decisions concerning listing of these waters as 303(d) waters and any criteria you assign them that will be important in our clean up actions.

Sincerely,

cc: RO
Enclosures

s/Peter W. Karp

PETER W. KARP
Forest Supervisor



TABBED PAGE

1999 American Fork Canyon Water Quality Data

dissolved metals; all values in µg/L (ppb)

Site	Date	As	Ba	Cd	Cr	Cu	Fe	Pb	Mn	Se	Ag	Zn	Al	Hg	R	R ²
Pacific Mine Well #1		25	190	21	<5.0	150	1470	2600	310	<1.0	<2.0	2300	640	<0.2	.213	.045
Pacific Mine Well #2		9	300	27	<5.0	170	778	14000	83	2.9	2.9	1600	220	<0.2	.800	.640
Pacific Mine Well #3		6.6	53	170	<5.0	260	9410	5500	94	3.4	57	21000	390	<0.2		
Pacific Mine Well #4		100	210	9.1	<5.0	70	1800	920	160	1.5	3.7	2600	370	<0.2		
Pacific Mine Well #5		340	41	1000	16	6000	229000	7000	1600	12	30	64000	13000	1.26	.244	.060
Pacific Mine Well #6		18	63	120	<5.0	<12	22800	1800	210	1.2	<2.0	27000	76	<0.2	.926	.857
Pacific Mine Well #7		<5.0	97	8	<5.0	34	1560	210	30	<1.0	<2.0	1700	790	<0.2	.999	.999
Pacific Mine Well #8		59	230	7.5	<5.0	60	4680	2600	130	1.3	26	1800	1500	<0.2	.989	.978
Pacific Mine Well #9		36	3900	110	13	100	3340	1100	21000	<1.0	<2.0	2200	17000	<0.2	.949	.900
3A-coldwater fish	chronic (4-day avg)	190		1.1		12		3.2		5	0.12	110	87	0.012		
3A-coldwater fish	acute (1-hour avg)	360		3.9		18	1000	82		20	4.1	120	750	2.4		
1C domestic use		50	1000	10				50		10	50			2		
EPA Max. Contaminant Levels		50	1000	10	50	1300	300	50	50	10	50	5000	50	2		
(proposed levels in <i>italics</i>)		3	1	6	0	1	9	9	8	0	1	3	9	0		
Average concentrations		74.2	565	164	NA	856	30538	3970	2624	3.7		13800	3776	NA		

1999 Stream Samples

	T-As	T-Ba	T-Cd	T-Cr	T-Cu	T-Fe	T-Pb	T-Mn	T-Se	T-Ag	T-Zn	T-Al	T-Hg	D-Ca	D-Mg	hardness
Mineral Basin 100 yds above Bog Mine	<5.0	30	<1.0	<5.0	<12	1810	11.2	14	<1.0	<2.0	50	130	<0.2	22.1	7.72	86.9
Lower Bog 25 ft below adit	<5.0	58	13	<5.0	20	7470	36	280	<1.0	<2.0	550	620	<0.2	11	3.52	41.9

Cadmium, Lead, Zinc

Iron, Copper

Aluminum

MCL

every sample exceeds acute criteria for fish

8 of 9 samples exceeds acute std

8 of 9 samples exceeds chronic std

exceeded for Fe, Pb, Al in 9 of 9 wells

exceeded for Mn in 8 of 9 wells

exceeded for Cd in 6 of 9 wells

exceeded for As and Zn in 3 of 9 wells

American Fork Canyon - Water Samples					Table values in micrograms per liter (ppb)																
					numbers in RED exceed water quality criteria																
Sample Location	Date		Ag	Al	As	Ba	Be	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Se	Tl	V	Zn
NFAF ab Pacific Mine	08/26/1998	T	<2.0	95	<5.0	46		<1.0		<5.0	<12	2120	<0.2	22		<3		<1.0			40
NFAF bl Pacific Mine	08/26/1998	T	<2.0	57	<5.0	47		<1.0		<5.0	<12	1960	<0.2	19		16		<1.0			100
Dutchman Flat bl culvert	09/08/1998	T	<2.0	40	<5.0	57		<1.0		<5.0	<12	1280	<0.2	14		35		<1.0			77
Mary Ellen Cr. ab Globe	09/03/1998	D	<2.0	330	<5.0	23		1.6		<5.0	26	138	<0.2	12		3.4		<1.0			42
Mary Ellen Mine North. adit	09/03/1998	D	<2.0	240	160	22		1.9		<5.0	24	18500	<0.2	140		31		<1.0			590
Mary Ellen Gulch, lower pond	08/18/1998	D	<2.0	<30	<5.0	86		1.5		6.7	<12	23.9	<0.2	22		16		<1.0			270
Mary Ellen Gulch, lower pond	08/18/1998	T	<2.0	74	<5.0	97		1.5		<5.0	25	682	<0.2	17		45		<1.0			240
Mary Ellen Gulch, creek bl mines	08/18/1998	D	<2.0	44	<5.0	43		1.3		<5.0	<12	<20	<0.2	47		18		<1.0			160
Mary Ellen Gulch, creek bl mines	08/18/1998	T	<2.0	190	9.7	41		2.3		<5.0	46	1550	<0.2	47		50		<1.0			310
Mary Ellen Cr. ab North Fork	09/08/1998	T	<2.0	380	9.2	73		1.5		<5.0	27	1460	<0.2	60		93		<1.0			220
State Water Quality Criteria																					
(3A - cold water fish) (ppb)	4-day		0.12	87	190			1.1			12	1000	0.012		160	3.2		5.0			110
	1-hour		4.1	750	360			3.9		16	18		2.4		1400	82		20			120
(1C - Domestic use) (ppb)	Maximum		50		50	1000		10		50			2			50		10			
(4 - agriculture) (ppb)	Maximum				100			10		100	200					100		50			
D = dissolved																					
T = total																					
												(ppm)									
NF American Fork ab Pacific Mine	10/21/1998	T	<2.0	31	<5.0	39		<1.0		<5.0	<12	0.076	<0.2	8.3		<3.0		<1.0			30
Pacific Mine Portal	10/21/1998	T	<2.0	240	24	87		13		<5.0	55	4.890	<0.2	18		31		<1.0			1600
NF American Fork bl Pacific Mine	10/21/1998	T	<2.0	40	<5.0	70		<1.0		<5.0	<12	0.143	<0.2	16		110		<1.0			69
NF American Fork @ Dutchman Fl	10/21/1998	T	<2.0	<30	<5.0	40		<1.0		<5.0	<12	0.060	<0.2	7.3		10		<1.0			49
NF American Fork ab Tibble Fork	10/21/1998	T	<2.0	<30	<5.0	40		<1.0		<5.0	<12	0.021	<0.2	<5.0		<3.0		<1.0			34
NF American Fork bl Tibble Fork	10/21/1998	T	<2.0	<30	<5.0	50		<1.0		<5.0	<12	0.050	<0.2	13		<3.0		<1.0			<30

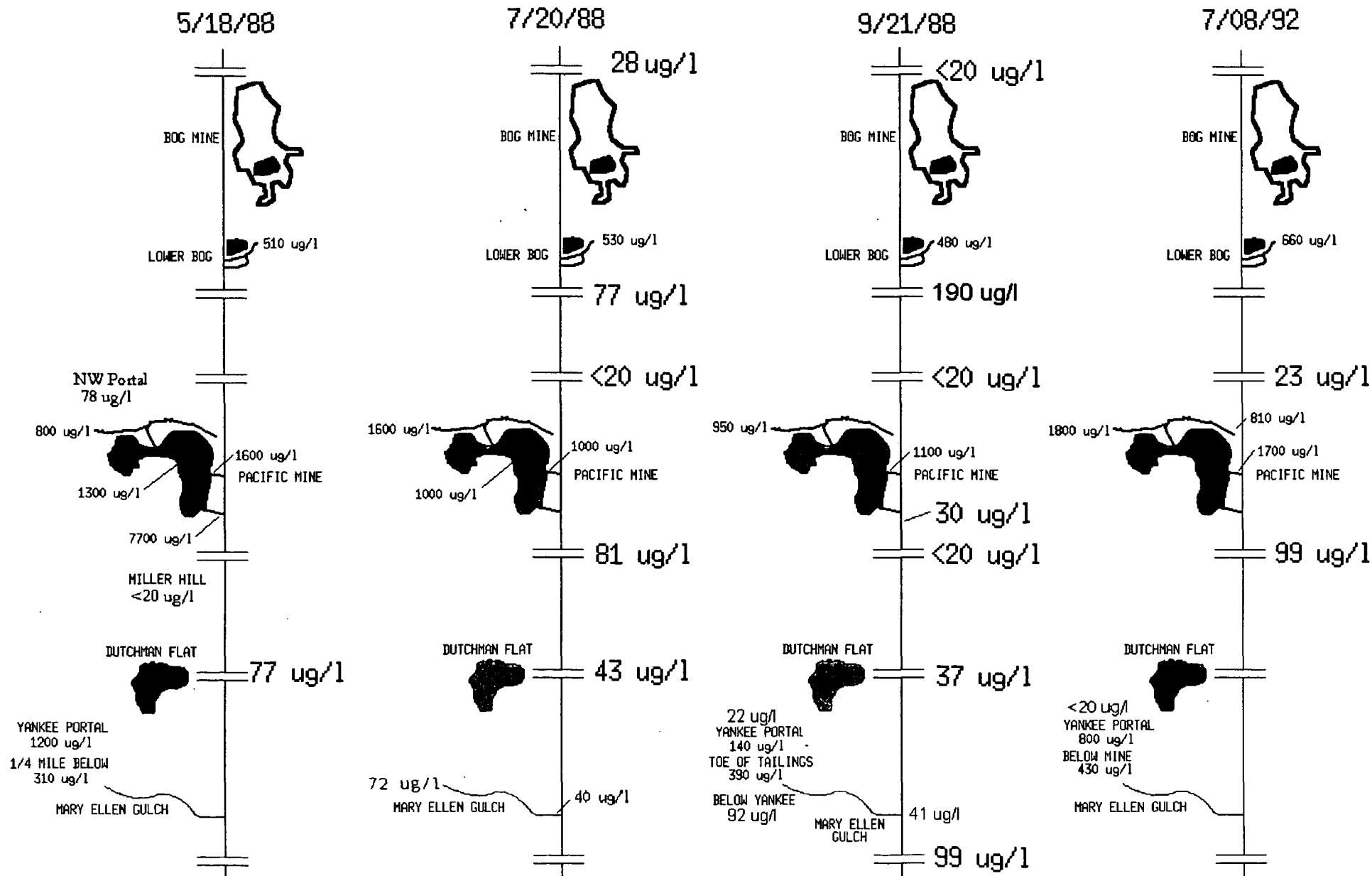
WATER QUALITY SAMPLING IN AMERICAN FORK CANYON																	
Water Chemistry Samples from Merriitt (5/1988), Mangum (7 & 9/1988) and Lidstone and Anderson (1992)																	
metals concentrations are µg/L except Fe, Ba in mg/L																	
Date	Lab No.	Site Name	T-Alk	TDS	pH	T-As	T-Ba	T-Cd	T-Cr	T-Cu	T-Fe	T-Pb	T-Mn	Hg	T-Se	T-Ag	T-Zn
05/18/1988	8802857	Lower Bog Mine Portal	0	90		1.5	0.04	12	<5.0	<20.0	7.9	<5.0	270	<0.2	<0.5	<2.0	510
05/18/1988	8802856	Pac. Mine NW Portal at pipe	198	208		1	0.15	<1.0	<5.0	<20.0	0.09	60	19	<0.2	<0.5	<2.0	78
05/18/1988	8802854	Pacific Mine portal	163	202		22	0.07	6	<5.0	34	4	25	11	0.2	<0.5	<2.0	800
05/18/1988	8802862	Pacific Mine outflow 200 yds bl portal	152	202		24	0.11	9	<5.0	62	6.6	180	23	0.2	<0.5	<2.0	1300
05/18/1988	8802859	Pacific Mine Portal at Creek	164	200		22.5	0.28	31	<5.0	60	5.3	4000	23	0.63	<0.5	5	1600
05/18/1988	8802860	Pac. Mine No. tailing	21	140		90	0.15	51	<5.0	260	13	20000	48	3.24	1.0	45	7700
05/18/1988	8802863	Miller Hill Portal	183	204		<1.0	0.04	<1.0	<5.0	<20.0	0.05	<5.0	6	<0.2	<0.5	<2.0	<20.0
05/18/1988	8802855	No. Fork AF at Dutchman Flat	83	102		2.5	0.06	<1.0	<5.0	<20.0	0.45	60	31	<0.2	<0.5	<2.0	77
05/18/1988	8802858	Mary Ellen Portal	36	206		100	0.02	4	<5.0	40	9.9	10	140	<0.2	<0.5	<2.0	1200
05/18/1988	8802861	Mary Ellen Cr. 1/4 mi bl mine area	92	132			0.04	2	<5.0	42	1.1	40	46	<0.2	<0.5	<2.0	310
			T-Alk	TDS	SO4	T-As	T-Ba	T-Cd	T-Cr	T-Cu	T-Fe	T-Pb	T-Mn	Hg	T-Se	T-Ag	T-Zn
07/20/1988	8803937	NF American Fork ab Bog Mine AF#1	91	128	29	<1.0	0.04	<1.0	<5.0	<20.0	0.16	<5.0	24	<0.2	<0.5	<2.0	28
07/20/1988	8803945	Lower Bog Mine Adit AF#2				3		13				5					530
07/20/1988	8803933	NF American Fork bl Bog Mine AF#3	73	120	31	2.5		1				<5.0					77
07/20/1988	8803939	NF American Fork ab Pacific Mine AF#3A	104	130	18	1	0.04	<1.0	<5.0	<20.0	0.03	<5.0	<5.0	<0.2	<0.5	<2.0	<20.0
07/20/1988	8803947	Pacific Mine main portal AF#4				20		13		42		15		<0.2			1600
07/20/1988	8803943	Pacific Mine NW portal AF#5				2						<5.0					
07/20/1988	8803944	Pacific Mine Center of Tailings AF#6				13		8		30		175					1000
07/20/1988	8803946	Pacific Mine lower edge of tailings AF#7				22		9		30		850		0.29			1000
07/20/1988	8803934	NF American Fork bl Pacific Mine AF#8	115	134		4.5		<1.0		<20.0		20		<0.2			81
07/20/1988	8803941	NF American Fork @ Dutchman Flat AF#9	143	174	16	<1.0	0.05	<1.0	<5.0	<20.0	0.03	5	7	<0.2	<0.5	<2.0	43
07/20/1988	8803936	NF American Fork bl Mary Ellen AF#11	135	158	20	3.5	0.05	<1									

~~ALCATE~~

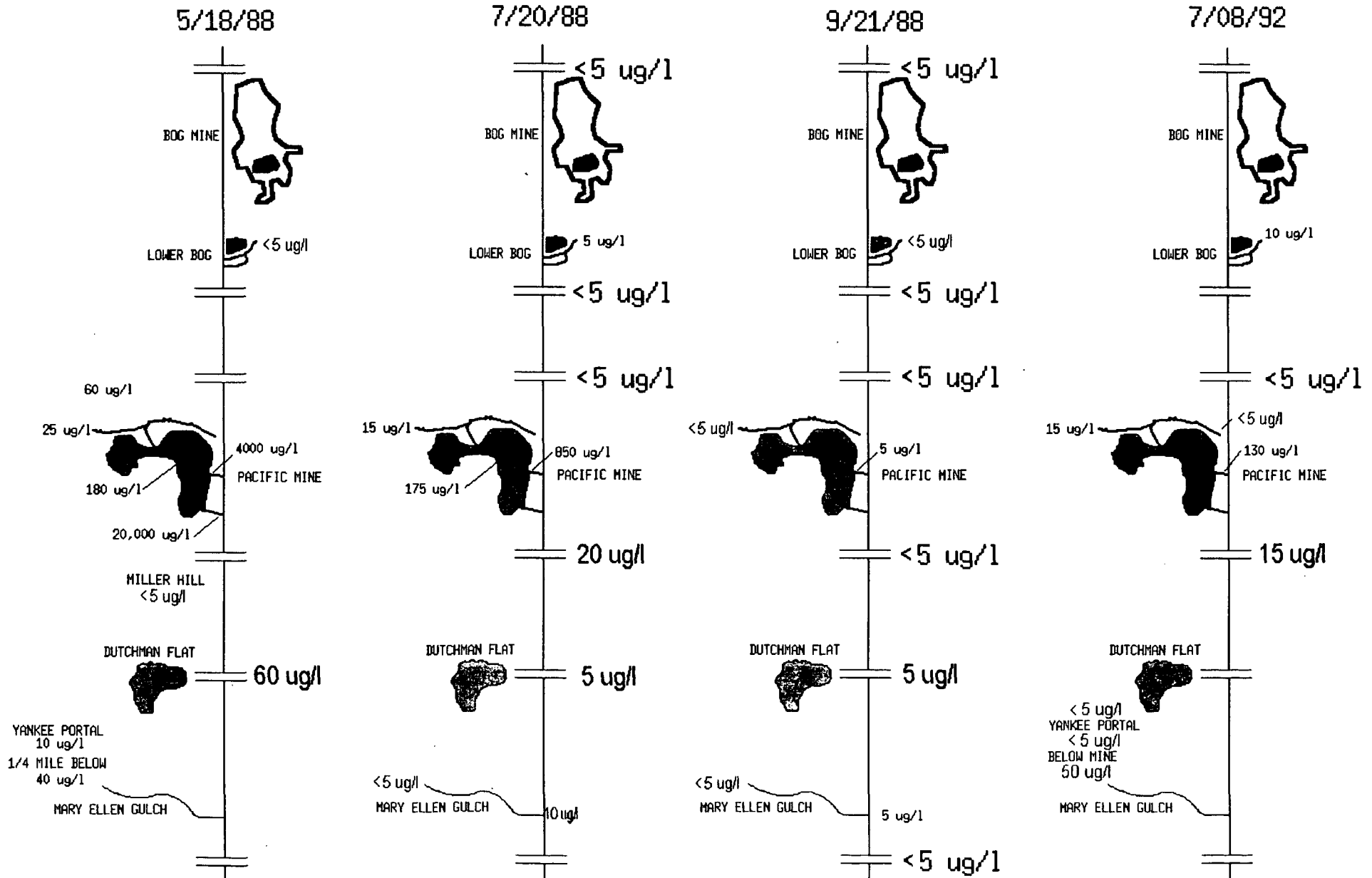
Water Chemistry Samples from Merritt (5/1988), Mangum (7 & 9/1988) and Lidstone and Anderson (1992)

			metals concentrations are µg/L except Fe, Ba in mg/L																			
			T-Alk	TDS	T-ha	SO4	T-Cd	T-Cu	T-Pb	T-Zn												
09/21/1988	8805334	NF American Fork ab Upper Bog Mine AF#1	89	158	136	45	<1.0	<20.0	<5.0	<20.0												
09/21/1988	8805337	Lower Bog Mine effluent AF#2		72	40	51	8	<20.0	<5.0	480												
09/21/1988	8805327	NF American Fork bl Lower Bog Mine AF#3	59	138	106	44	4	<20.0	<5.0	190												
09/22/1988	8805328	NF American Fork ab Pacific Mine AF#3A	109	148	135	25	<1.0	<20.0	<5.0	<20.0												
09/22/1988	8805325	Pacific Mine effluent AF#4		356	204	40	5	<20.0	<5.0	950												
09/22/1988	8805331	Pacific Mine effluent below all tailings AF#7		322	204	40	6	<20.0	5	1100												
09/22/1988	8805332	NF American Fork bl Pacific Mine AF#8	119	156	142	23	<1.0	<20.0	<5.0	<20.0												
09/22/1988	8805324	NF American Fork bl Pacific Mine AF#8A	58	188	142	22	<1.0	<20.0	<5.0	30												
09/22/1988	8805330	N.F. of American Fork @ Dutchman Flat AF#9	143	168	166	21	<1.0	<20.0	5	37												
09/22/1988	8805333	NF Amer Fork bl Mary Ellen AF#11	89	186	157	52	<1.0	<20.0	<5.0	99												
09/21/1988	8805326	Mary Ellen Cr. ab Yankee Mine AF#12	80	132	111	30	<1.0	<20.0	<5.0	22												
09/21/1988	8805323	Yankee Mine effluent AF#13	40	196	115	73	<1.0	<20.0	<5.0	140												
09/21/1988	8805335	Yankee Mine Lower Tailings AF#13A	33	182	124	84	2	<20.0	<5.0	390												
09/21/1988	8805329	Mary Ellen Creek bl Yankee Mine AF#14	62	166	131	69	<1.0	<20.0	<5.0	92												
09/22/1988	8805336	Mary Ellen Creek @ Mouth AF#10	136	190	162	26	<1.0	<20.0	5	41												
			major ions in mg/L; metals in µg/L																			
7/8/92 Water Samples (Lidstone rpt.)			T-Alk	TDS	pH	D-Ca	D-Mg	D-K	HCO	CO3	Cl-	SO4	H+As	H+Ba	H+Cd	H+Cr	H+Cu	H+Fe	H+Pb	H+Mn	H+Se	H+Zn
07/08/1992	9204265	American Fork #1 Pacific Mine effluent @ tailings	169	220	7.9	43	23	<1.0	206	0	<1.0	38.0	5	.11	14	<5.0	<20.0	0.3	130	92	<5.0	1700
07/08/1992	9204266	American Fork #2 NFAF bl Pacific Mine	105	132	8.0	28	12	<1.0	128	0	<1.0	15.9	<5.0	.05	<1.0	<5.0	<20.0	0.23	15	21	<5.0	99
07/08/1992	9204267	American Fork #3 NFAF ab Pacific Mine	97	138	7.9	26	11	<1.0	119	0	<1.0	17.6	<5.0	.04	<1.0	<5.0	<20.0	0.14	<5.0	16	<5.0	23
07/08/1992	9204268	American Fork #4 Pacific Mine effluent bl beaver pond	165	218	7.7	42	23	<1.0	202	0	<1.0	35.6	<5.0	.09	5	<5.0	<20.0	0.39	<5.0	18	<5.0	810
07/08/1992	9204269	American Fork #5 Lower Bog adit	0	120	3.9	11	3.6	1.1	0	0	1.4	64.4	<5.0	.04	14	<5.0	30	9.1	10	290	<5.0	660
07/08/1992	9204270	American Fork #6 Pacific Mine Portal	156	208	6.9	40	22	<1.0	191	0	1.4	39.5	20	.08	12	<5.0	47	4.5	15	15	<5.0	1800
07/08/1992	9204271	American Fork #7 Mary Ellen Portal	25	184	6.0	30	12	1.2	30	0	<1.0	102.1	70	.01	1	<5.0	<20.0	7.8	<5.0	210	<5.0	800
07/08/1992	9204272	American Fork #8 Mary Ellen Gulch ab mines	87	124	8.0	25	10	<1.0	106	0	<1.0	19.9	<5.0	.04	<1.0	<5.0	<20.0	0.08	<5.0	<5.0	<5.0	<20.0
07/08/1992	9204273	American Fork #9 Mary Ellen Gulch bl mines	77	148	7.9	29	12	<1.0	94	0	<1.0	49.5	10	.03	2	<5.0	60	1.1	50	60	<5.0	430

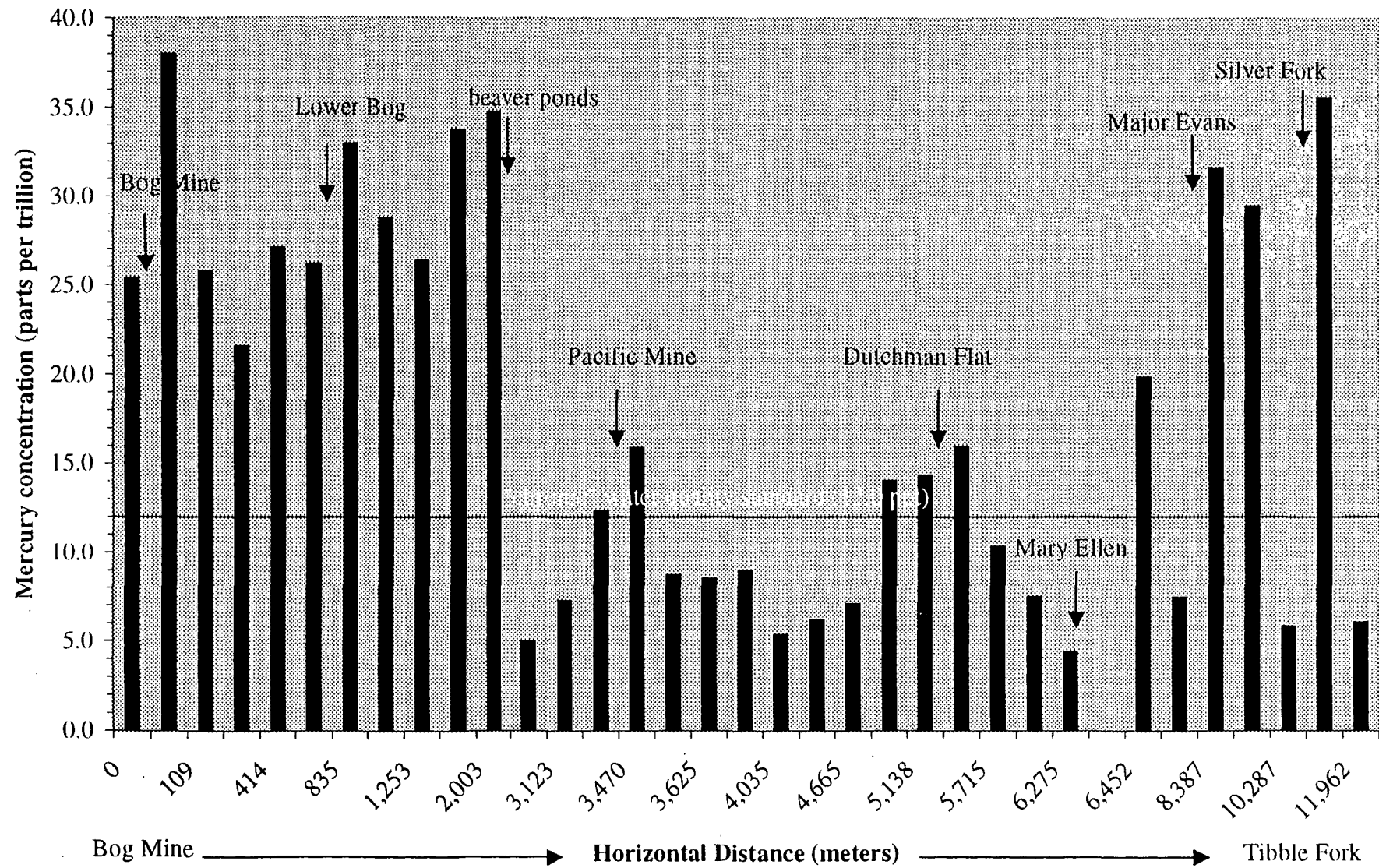
ZINC - 110 ug/l



LEAD - 3.2 ug/l



Mercury in American Fork Canyon



TABBED PAGE

MACROINVERTEBRATE ANALYSIS
 Fred A. Magnum, Regional Aquatic Ecologist
 Data Reformatted 01/19/00 By TVF

Station	Location	Organisms # per m2	DAT	SC g/m2	BCI 50	# Taxa	Zinc ug/l	Date
1	Above Bog Mine	8,981	10.2		93	21	< 20	09/21/1988
3	Below Lower Bog Mine	1,922	1.5	0.1		21	190	09/21/1988
3A	Above Pacific Mine	13,091	19.2		100	32	< 20	09/21/1988
8	Below Pacific Mine	3,888	15.2	0.4	100	31	< 20	09/21/1988
9	Dutchman Flat	7,819	18.2		98	32	37	09/21/1988
11	Below Mary Ellen Gulch	9,555	16.4	2.1	100	25	99	09/21/1988
12	Above Mines MEG	26,685	11.7	2.3	89	20	22	09/22/1988
14	Below Mines MEG	6,528	1.9	0.4		15	92	09/22/1988
10	Mouth Mary Ellen Gulch	8,013	15.2		100	25	41	09/22/1988
1	Above Bog Mine	7,866	10.7		100	20	28	07/20/1988
3	Below Lower Bog Mine	5,193	12.2		82	25	77	07/20/1988
3A	Above Pacific Mine	13,891	11.5	1.8	91	25	<20	07/20/1988
8	Below Pacific Mine	2,582	12.7		98	25	81	07/20/1988
9	Dutchman Flat	8,730			88	23	43	07/20/1988
11	Below Mary Ellen Gulch	18,163			85	22	40	07/20/1988
12	Above Mines MEG	12,424	11.6	2.1	88	25	< 20	07/21/1988
14	Below Mines MEG	30,110	1.2	2.0		17	110	07/21/1988
10	Mouth Mary Ellen Gulch	13,884		2.1	100	22	72	07/20/1988

DAT - Diversity Index (mean)

SC - Standing Crop

BIC 50 - Biotic Condition Index

Zinc - parts per billion

SCALE

Excellent

Good

Poor

Zinc

DAT

17 - 26

10 - 17

0 - 5

SC

4.0 - 12.0

1.6 - 4.0

0.0 - 0.5

BCI

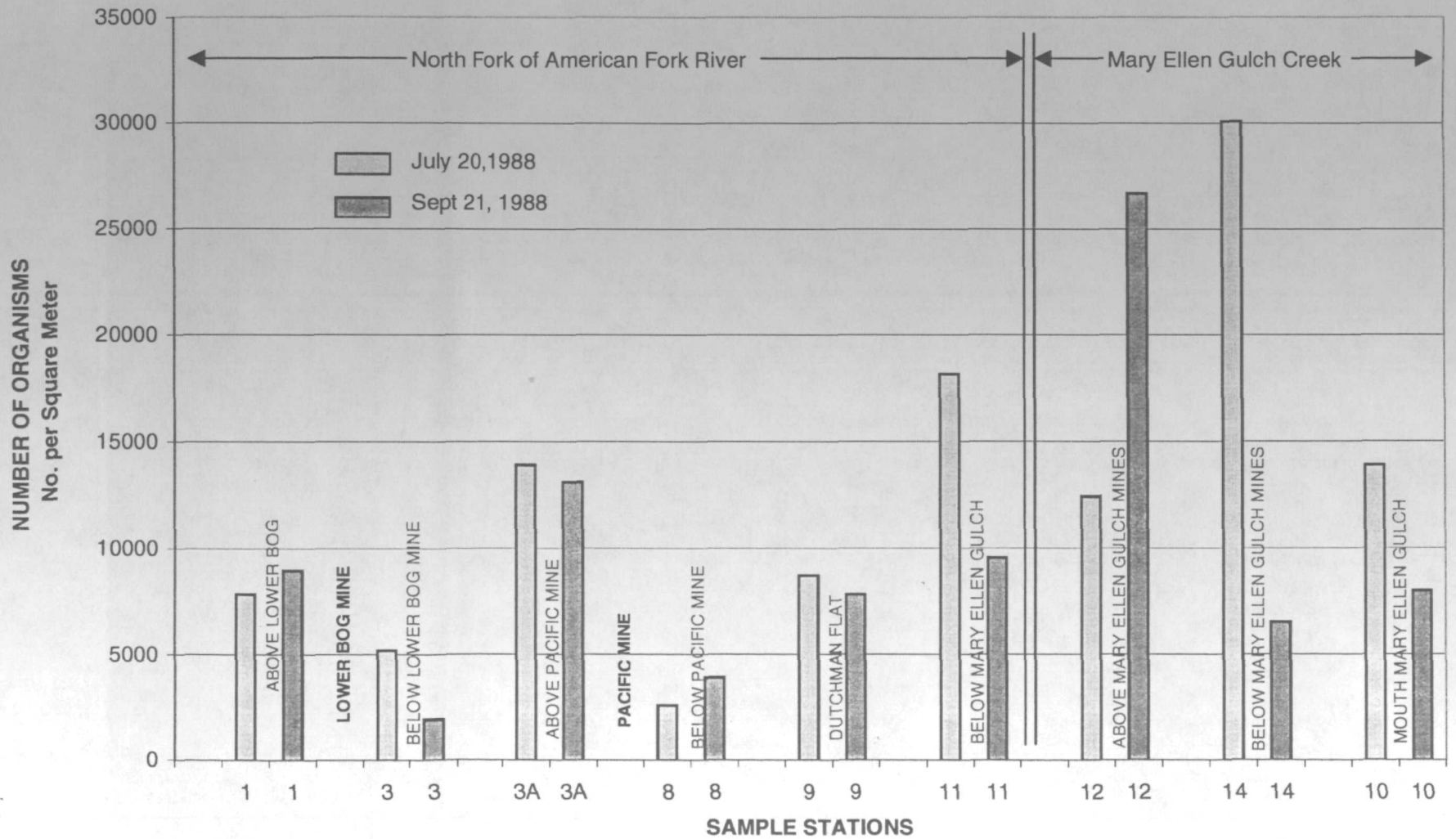
> 90

80 - 90

< 72

100 parts/billion is the threshold for sensitive aquatic invertebrates

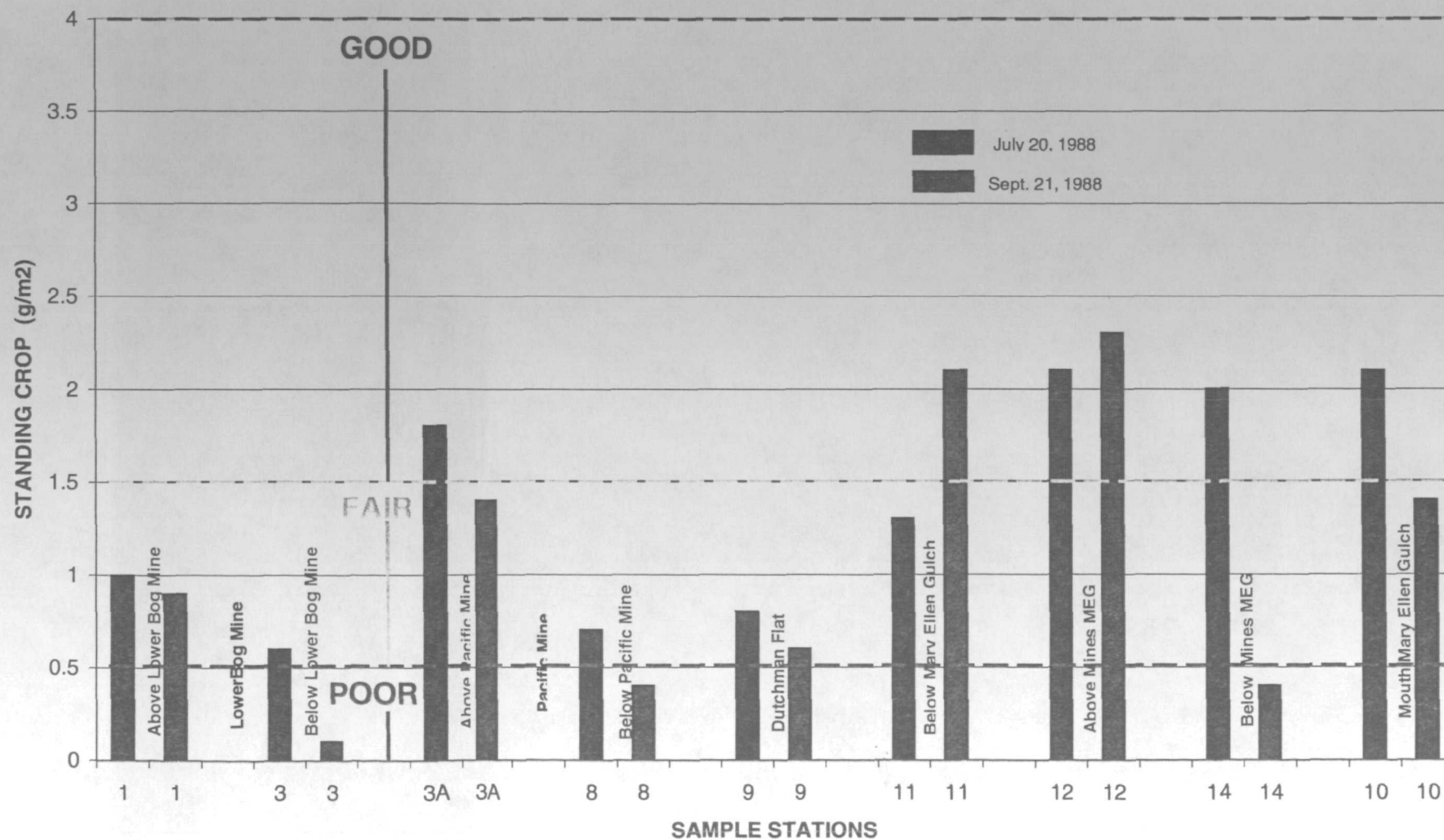
MACROINVERTEBRATE ANALYSIS
Upper American Fork Canyon
Total Number of Macroinvertebrates



MACROINVERTEBRATE ANALYSIS

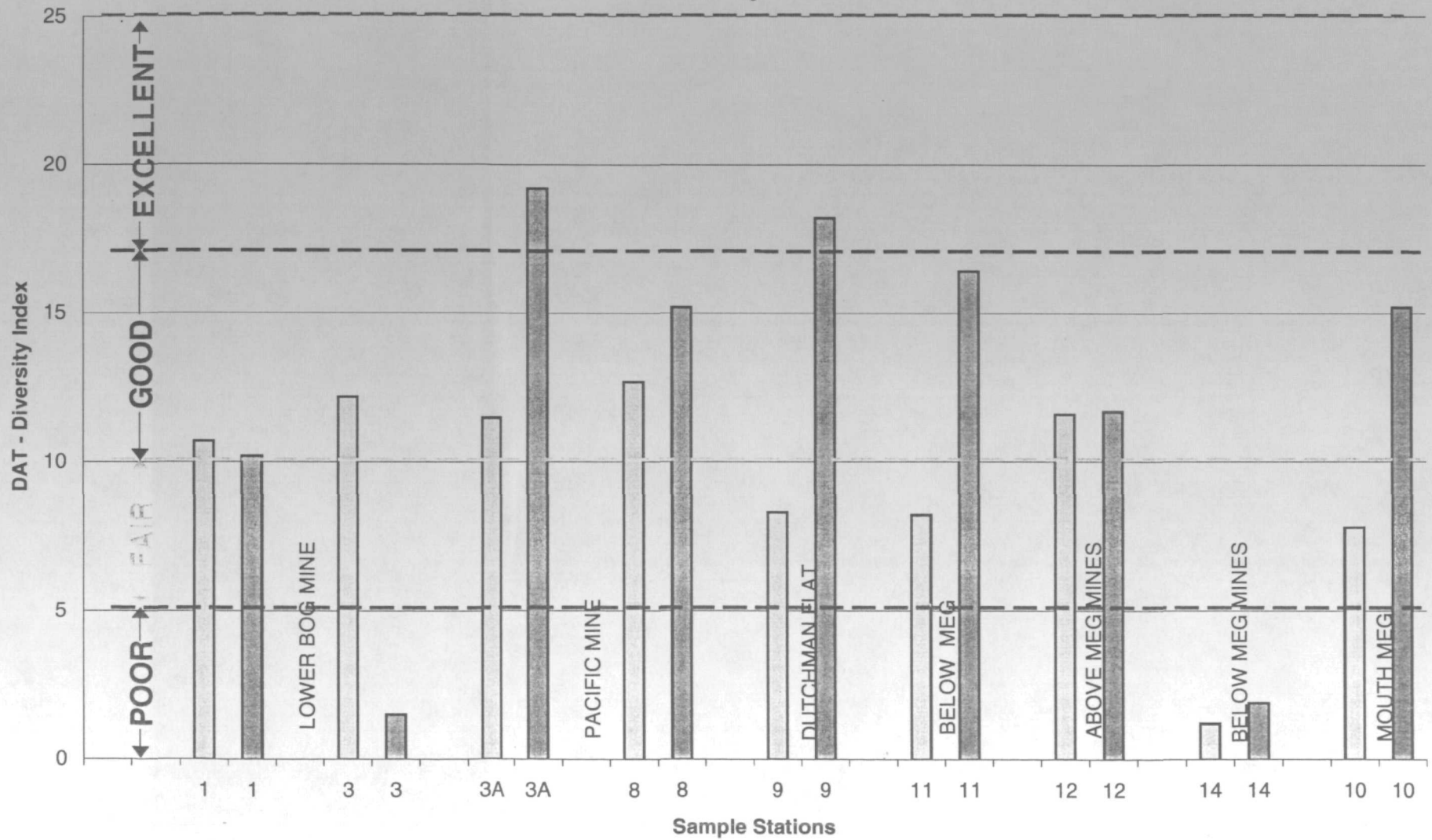
Upper American Fork Canyon

Standing Crop



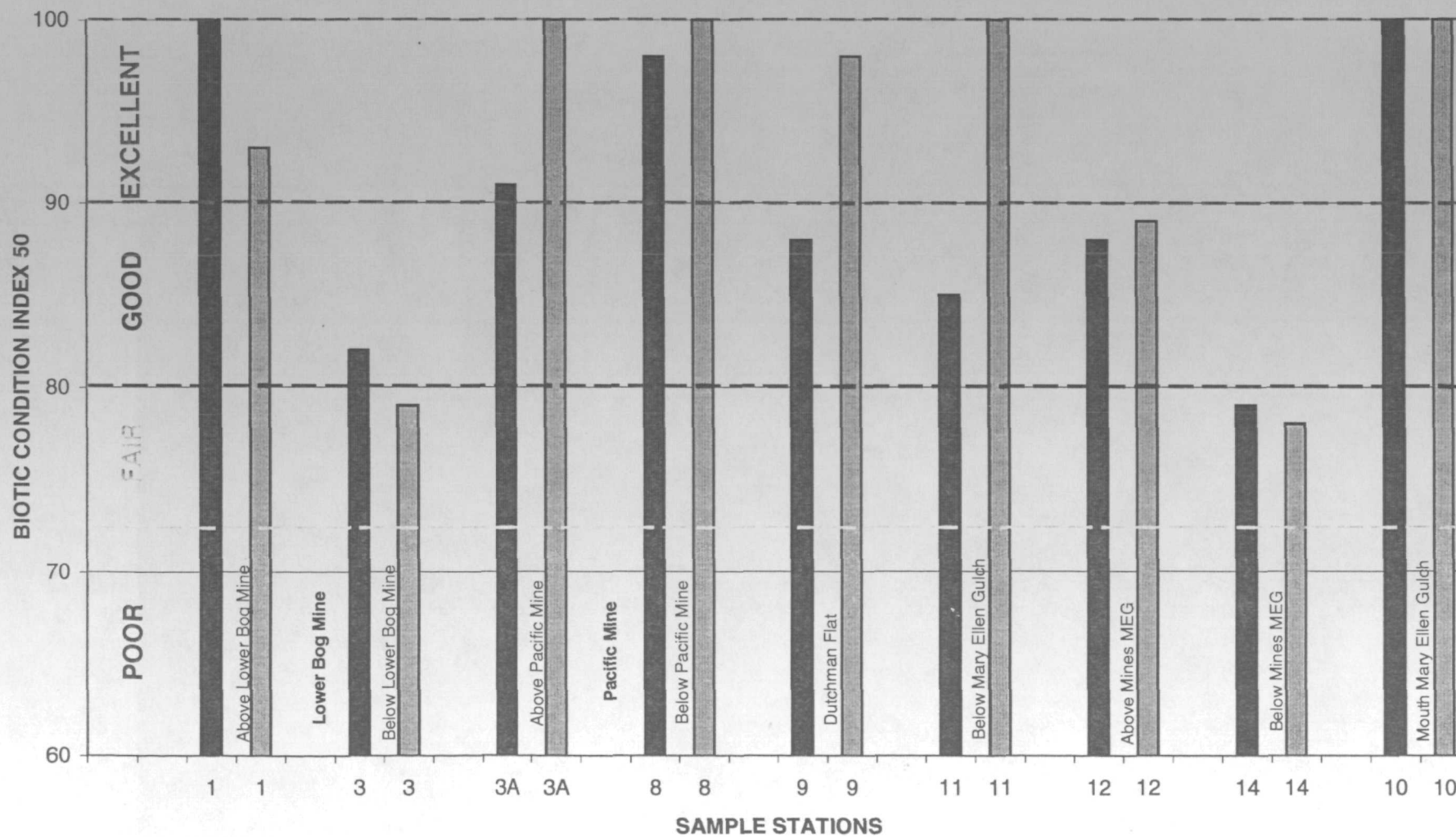
MACROINVERTEBRATE ANALYSIS
Upper American Fork Canyon
DAT Diversity Index

July 20, 1988
 Sept 21, 1988



MACROINVERTEBRATE ANALYSIS
Upper American Fork Canyon
Biotic Condition Index 50

July 20, 1988
 Sept. 21, 1988



TABBED PAGE

Fish Samples - North Fork of American Fork

Species+sample description by site

All samples collected 8/5/99

Data (re)confirmed correct 2/28/00 from original field sheets

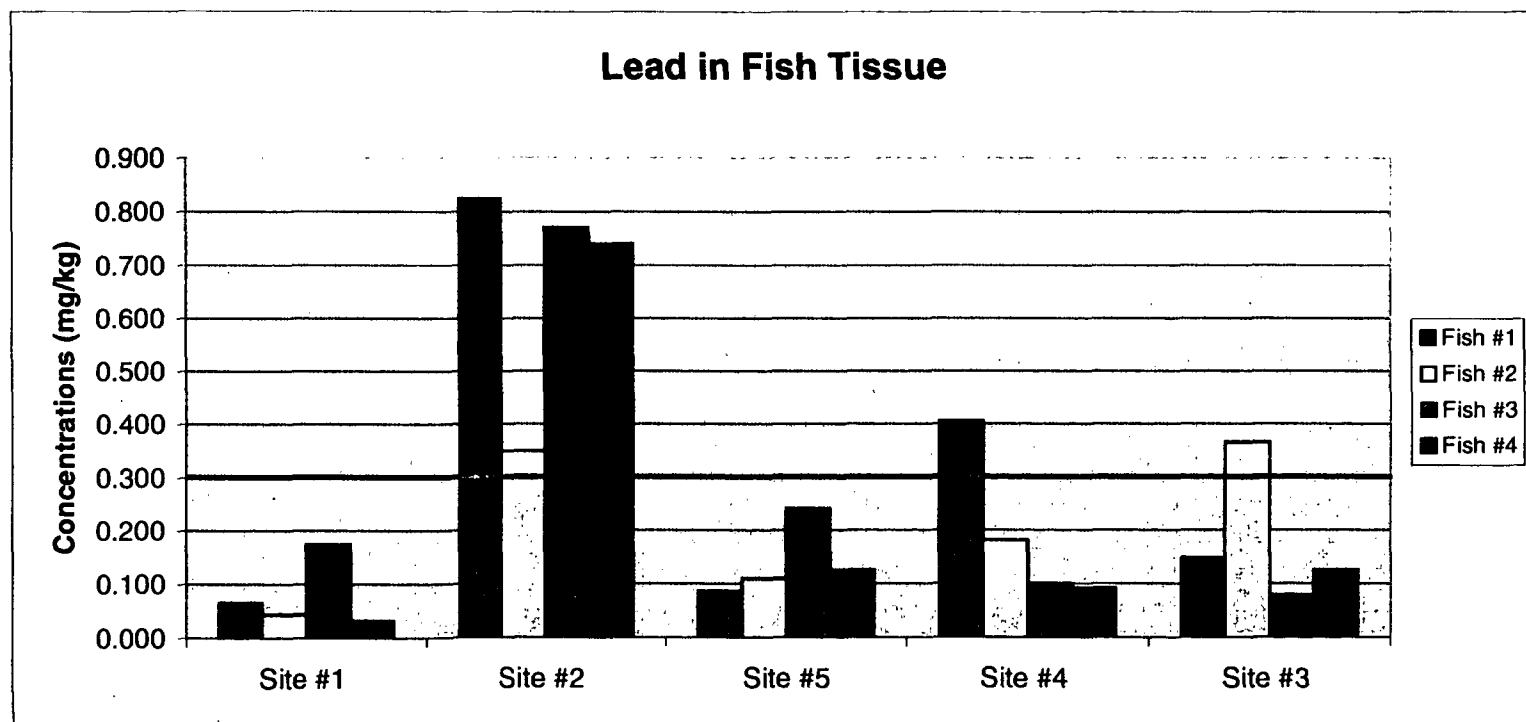
Site 1	Fish #1	Fish #2	Fish #3	Fish #4	Above Pacific Mine
length (mm):	197	270	234	230	
length (in):	7.8	10.6	9.2	9.1	
weight (gm):	74	212	138	136	
species:	hybrid	cutthroat	cutthroat	rainbow	
tissues:	muscle	muscle	muscle	muscle	
	liver	liver	liver	liver	
Site 2	Fish #1	Fish #2	Fish #3	Fish #4	Below Pacific Mine
length (mm):	204	196	194	189	
length (in):	8.0	7.7	7.6	7.4	
weight (gm):	76	80	56	70	
species:	cutthroat	cutthroat	cutthroat	rainbow	
tissues:	muscle	muscle	muscle	muscle	
	liver	liver	liver	liver	
Site 5	Fish #1	Fish #2	Fish #3	Fish #4	Above Major Evans Gulch
length (mm):	258	180	211	195	
length (in):	10.2	7.1	8.3	7.7	
weight (gm):	140	64	84	76	
species:	cutthroat	cutthroat	cutthroat	cutthroat	
tissues:	muscle	muscle	muscle	muscle	
	liver	liver	liver	liver	
Site 4	Fish #1	Fish #2	Fish #3	Fish #4	Above Tibble Fork Reservoir
length (mm):	275	221	247	260	
length (in):	10.8	8.7	9.7	10.2	
weight (gm):	192	106	164	164	
species:	brown	brown	brown	brown	
tissues:	muscle	muscle	muscle	muscle	
	liver	liver	liver	liver	
Site 3	Fish #1	Fish #2	Fish #3	Fish #4	Below Tibble Fork Reservoir
length (mm):	249	210	210	203	
length (in):	9.8	8.3	8.3	8.0	
weight (gm):	146	102	100	96	
species:	brown	brown	brown	brown	
tissues:	muscle	muscle	muscle	muscle	
	liver	liver	liver	liver	

Lead Concentrations By Site

SAMPLE LOCATIONS	Sites	Fish #1	Fish #2	Fish #3	Fish #4	Average
Above Pacific Mine	Site #1	0.065	0.043	0.173	0.032	0.078
Below Pacific Mine	Site #2	0.824	0.349	0.770	0.740	0.671
Above Major Evans	Site #5	0.085	0.109	0.241	0.125	0.140
Above Tibble Fork	Site #4	0.405	0.181	0.100	0.091	0.194
Below Tibble Fork	Site #3	0.148	0.365	0.078	0.125	0.179

Maximum	Minimum	Order of Magnitude
0.824	0.043	19

Lead

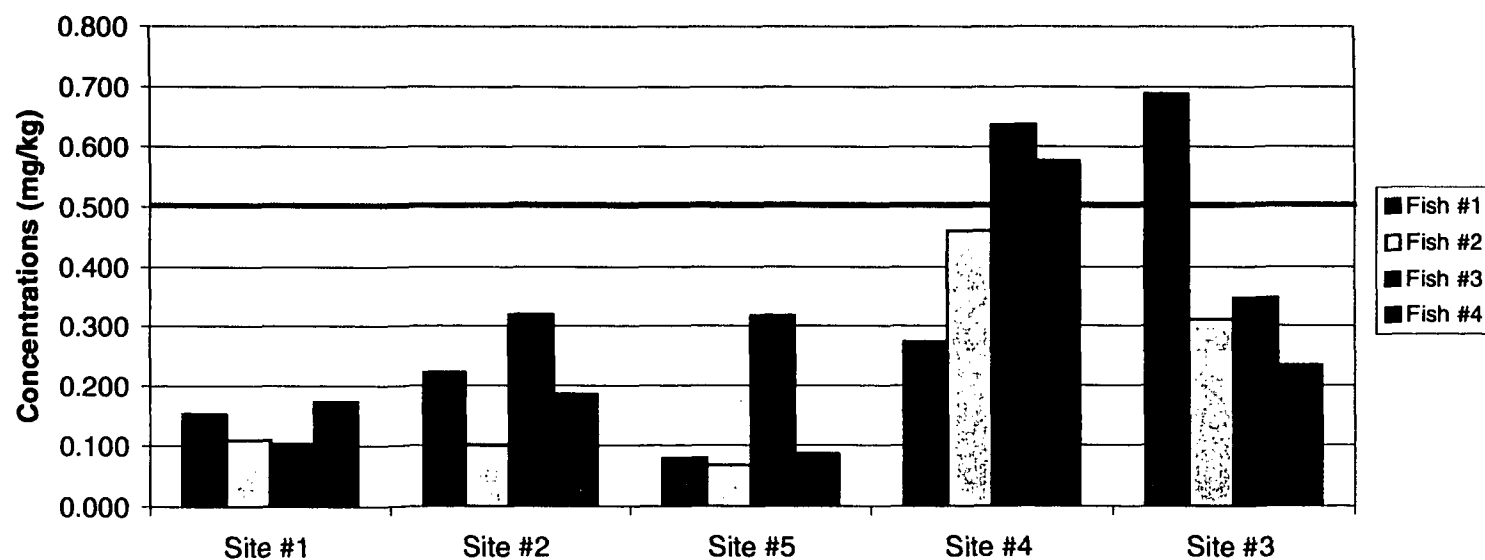


Arsenic Concentrations By Site

SAMPLE LOCATIONS	Sites	Fish #1	Fish #2	Fish #3	Fish #4	Average
Above Pacific Mine	Site #1	0.153	0.110	0.104	0.174	0.135
Below Pacific Mine	Site #2	0.222	0.101	0.319	0.186	0.207
Above Major Evans	Site #5	0.079	0.067	0.317	0.086	0.137
Above Tibble Fork	Site #4	0.274	0.460	0.637	0.577	0.487
Below Tibble Fork	Site #3	0.688	0.311	0.346	0.234	0.395

Maximum	Minimum	Order of Magnitude
0.688	0.067	10

Arsenic in Fish Tissue

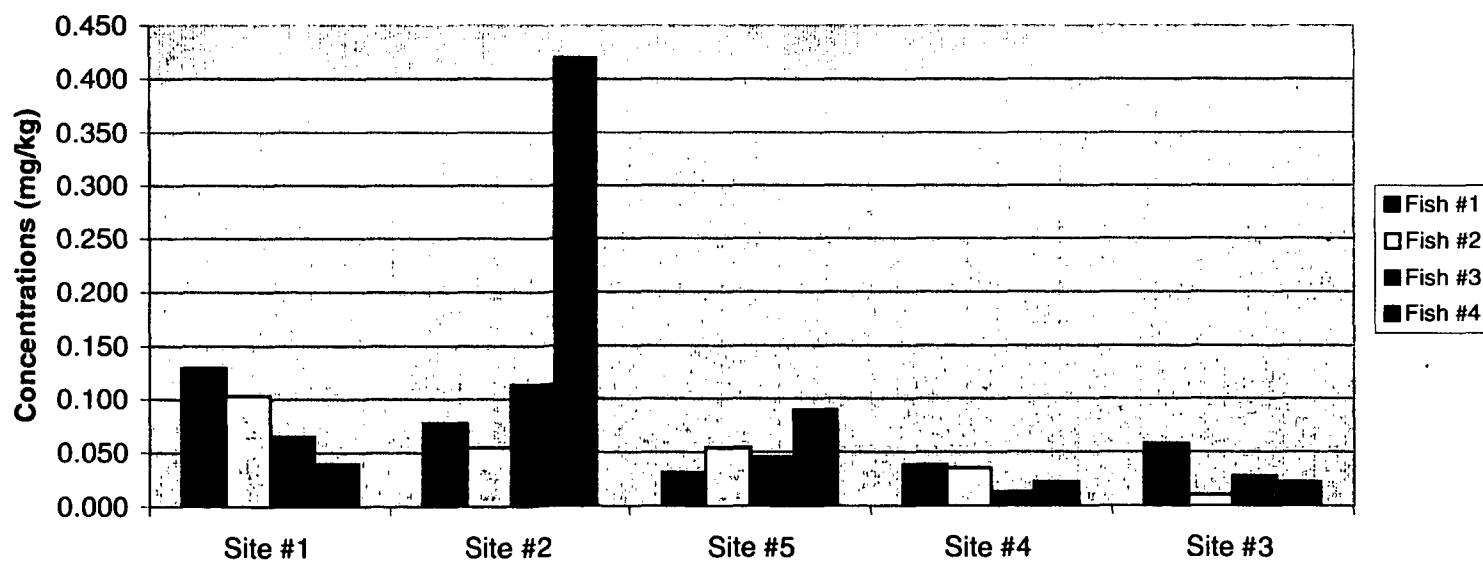


Cadmium Concentrations By Site

SAMPLE LOCATIONS	Sites	Fish #1	Fish #2	Fish #3	Fish #4	Average
Above Pacific Mine	Site #1	0.129	0.103	0.065	0.039	0.084
Below Pacific Mine	Site #2	0.077	0.055	0.113	0.420	0.166
Above Major Evans	Site #5	0.031	0.054	0.045	0.089	0.055
Above Tibble Fork	Site #4	0.038	0.035	0.013	0.022	0.027
Below Tibble Fork	Site #3	0.058	0.010	0.027	0.022	0.029

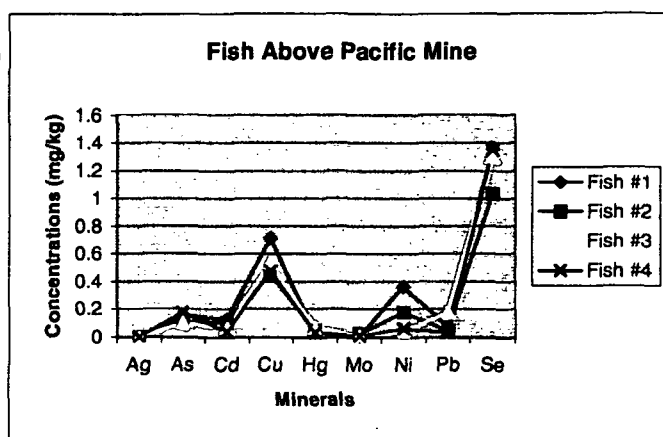
Maximum	Minimum	Order of Magnitude
0.129	0.010	13

Cadmium in Fish Tissue



Site #1 - above Pacific Mine

	#1-muscle	#2-muscle	#3-muscle	#4-muscle	avg	stdev
Ag	<.001	0.001	0.001	<.001	0.00	0.00
	0.725	0.696	0.527	0.511	0.61	0.11
As	0.153	0.11	0.104	0.174	0.14	0.03
B	0.024	0.143	0.008	<.001	0.06	0.07
Ba	0.259	0.159	0.047	0.048	0.13	0.10
Be	<.001	<.001	<.001	<.001	#DIV/0!	#DIV/0!
Ca	1746.369	809.933	300.578	353.667	802.64	669.41
Cd	0.129	0.103	0.065	0.039	0.084	0.04
Co	0.081	0.055	0.06	0.055	0.06	0.01
Cr	1.442	1.266	1.195	1.151	1.26	0.13
Cu	0.714	0.455	0.537	0.475	0.55	0.12
Fe	14.249	9.469	8.979	7.451	10.04	2.94
Hg	0.03	0.05	0.062	0.029	0.043	0.02
K	4071.95	4267.337	4618.108	4653.005	4402.60	280.93
Li	0.01	0.017	0.015	0.007	0.01	0.00
Mg	321.387	298.448	314.006	322.212	314.01	11.01
Mn	0.747	0.344	0.26	0.279	0.41	0.23
Mo	0.002	0.024	0.01	0.007	0.01	0.01
Na	536.915	447.314	456.813	473.64	478.67	40.33
Ni	0.366	0.177	0.043	0.06	0.16	0.15
P	3378.06	2865.441	2784.235	2684.511	2928.06	308.99
Pb	0.065	0.043	0.173	0.032	0.078	0.06
Sb	0.001	0.004	0.002	0.002	0.00	0.00
Se	1.361	1.033	1.296	1.35	1.26	0.15
Si	27.451	26.917	28.224	25.262	26.96	1.25
Sn	0.002	0.003	0.001	0.002	0.00	0.00
	0.562	0.264	0.072	0.089	0.25	0.23
Tl	0.029	0.027	0.013	0.019	0.02	0.01
V	0.027	0.016	0.025	0.025	0.02	0.00
Zn	10.12	5.1	4.674	4.378	6.07	2.72
Ca/K	0.429	0.190	0.065	0.076	0.19	0.17
Ca/M	12.900	6.059	4.333	5.571	7.22	3.86
Na/K	0.000	0.000	0.000	0.000	0.00	0.00
Cu/F	1.930	3.680	4.596	4.125	3.58	1.16
Cu/Z	357.000	18.958	53.700	67.857	124.38	156.44
Pb/F	0.027	0.021	0.020	0.016	0.02	0.00

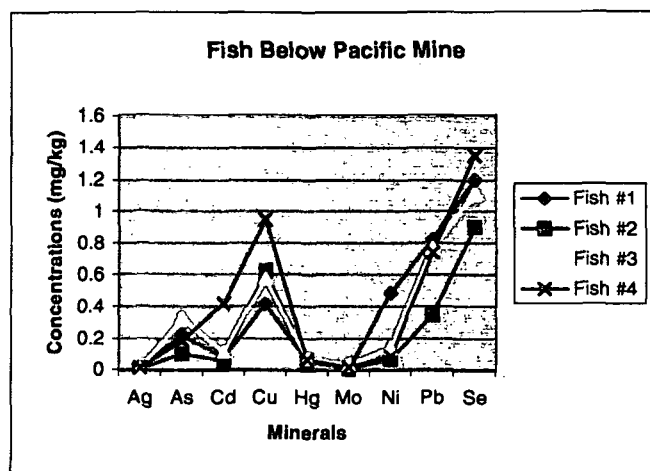


Site #1 - Above Pacific Mine

	Fish #1	Fish #2	Fish #3	Fish #4	Average	Std. Dev.	Maximum	Minimum	Order of Magnitude
Ag	<.001	0.001	0.001	<.001	0.001	0.000	0.001	0.001	1.000
As	0.153	0.11	0.104	0.174	0.135	0.034	0.174	0.104	1.673
Cd	0.129	0.103	0.065	0.039	0.084	0.040	0.129	0.039	3.308
Cu	0.714	0.455	0.537	0.475	0.545	0.118	0.714	0.455	1.569
Fe	14.249	9.469	8.979	7.451	10.037	2.937	14.249	7.451	1.912
Hg	0.03	0.05	0.062	0.029	0.043	0.016	0.062	0.029	2.138
Mo	0.002	0.024	0.01	0.007	0.011	0.009	0.024	0.002	12.000
Ni	0.366	0.177	0.043	0.06	0.162	0.149	0.366	0.043	8.512
Pb	0.065	0.043	0.173	0.032	0.078	0.065	0.173	0.032	5.406
Se	1.361	1.033	1.296	1.35	1.260	0.154	1.361	1.033	1.318
Zn	10.12	5.1	4.674	4.378	6.068	2.718	10.120	4.378	2.312

Site #2 - between Pacific Mine and Dutchman Flat

	#1-muscle	#2-muscle	#3-muscle	#4-muscle	avg	stdev
Ag	0.002	0.002	0.004	0.011	0.0048	0.00
	1.733	0.426	0.004	0.66	0.71	0.74
As	0.222	0.101	0.319	0.186	0.21	0.09
B	0.02	<.001	0.09	0.041	0.05	0.04
Ba	0.474	0.065	0.111	0.226	0.22	0.18
Be	<.001	<.001	0.001	<.001	0.00	#DIV/0!
Ca	2475.174	451.911	691.956	406.244	1006.32	987.22
Cd	0.077	0.055	0.113	0.42	0.166	0.17
Co	0.028	0.081	0.04	0.054	0.05	0.02
Cr	1.217	1.133	1.08	1.267	1.17	0.08
Cu	0.414	0.626	0.577	0.947	0.64	0.22
Fe	15.031	6.292	7.299	16.08	11.18	5.09
Hg	0.056	0.05	0.068	0.063	0.059	0.01
K	4304.733	4244.749	4232.116	3930.97	4178.14	167.80
Li	0.023	0.007	0.025	0.016	0.02	0.01
Mg	341.875	278.71	264.422	251.294	284.08	40.13
Mn	0.823	0.16	0.186	0.185	0.34	0.32
Mo	0.006	0.004	0.027	0.015	0.01	0.01
Na	537.86	549.477	651.168	722.105	615.15	87.60
Ni	0.487	0.065	0.14	0.085	0.19	0.20
P	3980.735	2509.72	2847.32	2578.635	2979.10	683.45
Pb	0.824	0.349	0.77	0.74	0.671	0.22
Sb	0.002	0.001	0.006	0.004	0.00	0.00
Se	1.197	0.902	1.11	1.351	7.85	0.19
	23.977	23.856	23.926	28.575	25.08	2.33
Sn	0.003	0.002	0.004	0.003	0.00	0.00
Sr	0.712	0.146	0.163	0.106	0.28	0.29
Tl	0.013	0.012	0.012	0.012	0.01	0.00
V	0.034	0.034	0.03	0.035	0.03	0.00
Zn	12.639	10.778	13.396	10.455	11.82	1.43
Ca/K	0.575	0.106	0.164	0.103	0.24	0.23
Ca/M	3.348	7.857	4.520	26.250	10.49	10.68
Na/K	0.000	0.000	0.000	0.000	0.00	0.00
Cu/F	1.479	7.081	5.806	6.849	5.30	2.61
Cu/Z	69.000	156.500	21.370	63.133	77.50	56.77
Pb/F	0.028	0.011	0.011	0.022	0.02	0.01

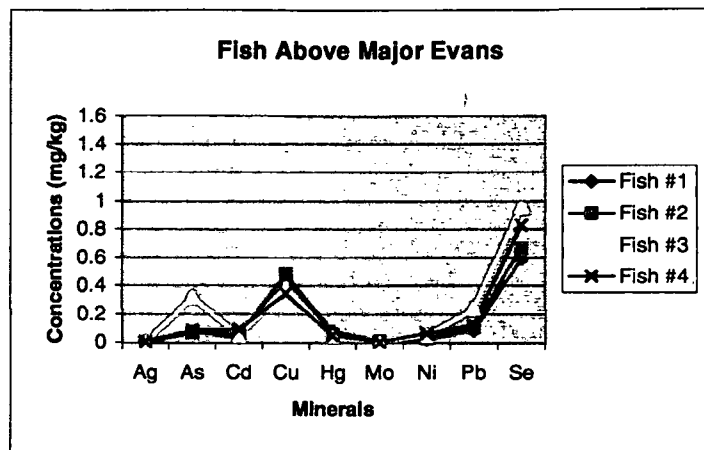


Site #2 - Between Pacific Mine and Dutchman Flat

	Fish #1	Fish #2	Fish #3	Fish #4	Average	Stnd. Dev.	Maximum	Minimum	Order of Magnitude
Ag	0.002	0.002	0.004	0.011	0.005	0.004	0.011	0.002	5.500
As	0.222	0.101	0.319	0.186	0.207	0.090	0.319	0.101	3.158
Cd	0.077	0.055	0.113	0.42	0.166	0.171	0.420	0.055	7.636
Cu	0.414	0.626	0.577	0.947	0.641	0.223	0.947	0.414	2.287
Fe	15.031	6.292	7.299	16.08	11.176	5.092	16.080	6.292	2.556
Hg	0.056	0.05	0.068	0.063	0.059	0.008	0.068	0.050	1.360
Mo	0.006	0.004	0.027	0.015	0.013	0.010	0.027	0.004	6.750
	0.487	0.065	0.14	0.085	0.194	0.198	0.487	0.065	7.492
Pb	0.824	0.349	0.77	0.74	0.671	0.217	0.824	0.349	2.361
Se	1.197	0.902	1.11	1.351	1.140	0.187	1.351	0.902	1.498
Zn	12.639	10.778	13.396	10.455	11.817	1.426	13.396	10.455	1.281

Site #5 - North Fork ab Major Evans Gulch

	#1-muscle	#2-muscle	#3-muscle	#4-muscle	avg	stdev
Ag	0.001	0.001	0.001	0.002	0.0013	0.00
As	0.947	0.605	0.335	0.296	0.55	0.30
B	0.079	0.067	0.317	0.086	0.14	0.12
Ba	0.046	<.001	0.004	0.002	0.02	0.02
Be	0.076	0.097	0.046	0.043	0.07	0.03
Bi	<.001	0.001	<.001	<.001	0.00	#DIV/0!
Ca	146.77	294.703	288.207	337.817	266.87	83.04
Cd	0.031	0.054	0.045	0.089	0.055	0.02
Co	0.014	0.032	0.012	0.051	0.03	0.02
Cr	1.091	0.965	1.112	1.241	1.10	0.11
Cu	0.478	0.386	0.349	0.441	0.41	0.07
Fe	9.075	5.951	4.81	6.61	6.61	1.80
Hg	0.078	0.054	0.04	0.048	0.055	0.02
K	4216.436	4573.566	4752.937	4676.883	4554.96	237.35
Li	0.011	0.011	0.01	0.014	0.01	0.00
Mg	268.294	315.364	305.532	314.741	300.98	22.25
Mn	0.148	0.162	0.369	0.172	0.21	0.10
Mo	0.01	0.007	0.005	0.004	0.01	0.00
Na	490.221	455.727	429.647	442.217	454.45	26.12
Ni	0.022	0.031	0.045	0.065	0.04	0.02
P	2055.227	2280.238	2652.052	2720.539	2427.01	314.41
Pb	0.085	0.109	0.241	0.125	0.14	0.07
Sb	0.002	0.003	0.001	0.001	0.00	0.00
Se	0.594	0.668	0.954	0.83	0.76	0.16
Si	21.054	19.301	20.532	25.367	21.56	2.64
Ta	<.001	0.001	0.001	<.001	0.00	0.00
Tb	0.06	0.08	0.07	0.124	0.08	0.03
Ti	0.014	0.015	0.012	0.016	0.01	0.00
V	0.023	0.021	0.022	0.027	0.02	0.00
Zn	5.616	5.345	5.85	5.326	5.53	0.25
Ca/K	0.035	0.064	0.061	0.072	0.06	0.02
Ca/M	2.818	4.909	4.500	6.357	4.65	1.46
Na/K	0.000	0.000	0.000	0.000	0.00	0.00
Cu/Fe	7.372	5.957	3.014	7.215	5.89	2.02
Cu/Z	47.800	68.286	77.200	87.250	70.13	16.78
Pb/Fe	0.019	0.013	0.011	0.015	0.01	0.00

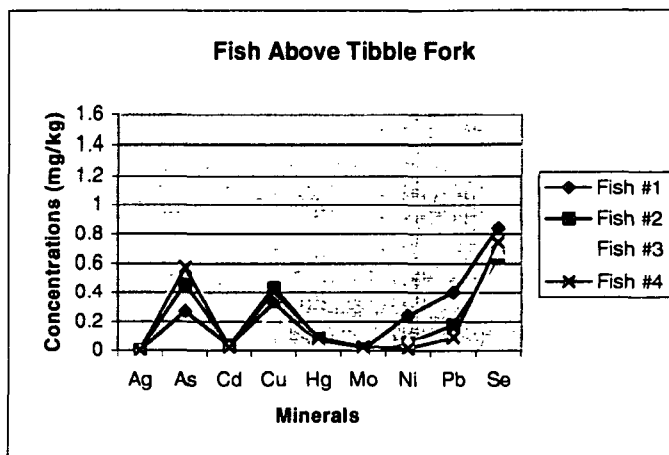


Site #5 - North Fork Above Major Evans Gulch

	Fish #1	Fish #2	Fish #3	Fish #4	Average	Std. Dev.	Maximum	Minimum	Order of Magnitude
Ag	0.001	0.001	0.001	0.002	0.001	0.001	0.002	0.001	2.000
As	0.079	0.067	0.317	0.086	0.137	0.120	0.317	0.067	4.731
Cd	0.031	0.054	0.045	0.089	0.055	0.025	0.089	0.031	2.871
Cu	0.478	0.478	0.386	0.349	0.423	0.066	0.478	0.349	1.370
Fe	9.075	5.951	4.81	6.61	6.612	1.803	9.075	4.810	1.887
Hg	0.078	0.054	0.04	0.048	0.055	0.016	0.078	0.040	1.950
Mo	0.01	0.007	0.005	0.004	0.007	0.003	0.010	0.004	2.500
Ni	0.022	0.031	0.045	0.065	0.041	0.019	0.065	0.022	2.955
Pb	0.085	0.109	0.241	0.125	0.140	0.069	0.241	0.085	2.835
Se	0.594	0.668	0.954	0.83	0.762	0.162	0.954	0.594	1.606
Zn	5.616	5.345	5.85	5.326	5.534	0.249	5.850	5.326	1.098

Site #4 - North Fork ab Tibble Fork Res

	#1-muscle	#2-muscle	#3-muscle	#4-muscle	avg	stdev
Ag	0.003	0.002	<.001	0.002	0.002	0.001
	2.124	0.918	0.382	0.494	0.980	0.797
As	0.274	0.46	0.637	0.577	0.487	0.160
B	0.003	<.001	<.001	0.1	0.052	0.069
Ba	0.178	0.117	0.044	0.029	0.092	0.069
Be	0.001	<.001	<.001	<.001	0.001	#DIV/0!
Ca	1380.538	387.154	405.349	205.836	594.719	531.566
Cd	0.038	0.035	0.013	0.022	0.027	0.012
Co	0.03	0.062	0.04	0.074	0.052	0.020
Cr	1.047	1.03	1.022	1.035	1.034	0.010
Cu	0.33	0.437	0.25	0.409	0.357	0.084
Fe	18.223	9.256	5.652	6.948	10.020	5.668
Hg	0.052	0.081	0.053	0.087	0.068	0.018
K	4251.153	4409.86	4408.144	4508.717	4394.469	106.483
Li	0.012	0.012	0.005	0.017	0.014	0.005
Mg	305.631	305.356	314.277	303.767	307.258	4.751
Mn	0.43	0.278	0.148	0.161	0.254	0.131
Mo	0.009	0.004	0.001	0.025	0.010	0.011
Na	503.688	442.607	415.979	536.393	474.667	55.150
Ni	0.243	0.057	0.062	0.016	0.095	0.101
P	2991.803	2386.542	2341.892	2187.296	2476.883	353.736
Pb	0.405	0.181	0.1	0.091	0.194	0.146
Sb	0.003	0.002	<.001	0.005	0.003	0.002
Se	0.841	0.645	0.675	0.744	0.726	0.087
Si	24.574	21.281	19.482	22.976	22.078	2.192
	0.004	0.009	0.001	0.001	0.004	0.004
Sr	2.556	0.649	0.629	0.305	1.035	1.026
Tl	0.018	0.035	0.02	0.028	0.025	0.008
V	0.043	0.034	0.031	0.017	0.031	0.011
Zn	5.759	5.703	4.37	5.47	5.326	0.649
Ca/K	0.325	0.088	0.092	0.046	0.138	0.127
Ca/M	4.517	1.268	1.290	0.678	1.938	1.743
Na/K	0.118	0.100	0.094	0.119	0.108	0.013
Cu/F	0.018	0.047	0.044	0.059	0.042	0.017
Cu/Z	0.057	0.077	0.057	0.075	0.066	0.011
Pb/F	0.0222	0.0196	0.0177	0.0131	0.018	0.004

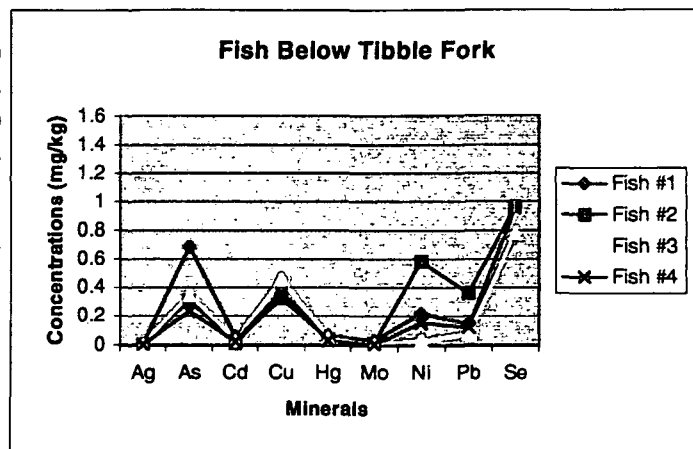


Site #4 - North Fork Above Tibble Fork Res

	Fish #1	Fish #2	Fish #3	Fish #4	Average	Std. Dev.	Maximum	Minimum	Order of Magnitude
Ag	0.003	0.002	<.001	0.002	0.002	0.001	0.003	0.002	1.500
As	0.274	0.46	0.637	0.577	0.487	0.160	0.637	0.274	2.325
Cd	0.038	0.035	0.013	0.022	0.027	0.012	0.038	0.013	2.923
Cu	0.33	0.437	0.25	0.409	0.357	0.084	0.437	0.250	1.748
Fe	18.223	9.256	5.652	6.948	10.020	5.668	18.223	5.652	3.224
Hg	0.052	0.081	0.053	0.087	0.068	0.018	0.087	0.052	1.673
Mo	0.009	0.004	0.001	0.025	0.010	0.011	0.025	0.001	25.000
Ni	0.243	0.057	0.062	0.016	0.095	0.101	0.243	0.016	15.188
Pb	0.405	0.181	0.1	0.091	0.194	0.146	0.405	0.091	4.451
Se	0.841	0.645	0.675	0.744	0.726	0.087	0.841	0.645	1.304
Zn	5.759	5.703	4.37	5.47	5.326	0.649	5.759	4.370	1.318

Site # 3 North Fork below Tibble Fork

	#1-muscle	#2-muscle	#3-muscle	#4-muscle	avg	stdev
Ag	0.003	0.001	0.001	0.001	0.0015	0.00
Al	0.684	0.549	0.665	0.883	0.70	0.14
As	0.688	0.311	0.346	0.234	0.39	0.20
B	0.108	0.061	0.037	0.027	0.06	0.04
Ba	0.083	0.163	0.043	0.066	0.09	0.05
Be	<.001	<.001	<.001	0.001	0.00	#DIV/0!
Ca	1153.04	2867.072	254.201	804.437	1269.69	1127.37
Cd	0.058	0.01	0.027	0.022	0.029	0.02
Co	0.055	0.09	0.045	0.055	0.06	0.02
Cr	1.176	1.278	1.247	1.187	1.22	0.05
Cu	0.339	0.325	0.452	0.364	0.37	0.06
Fe	11.341	23.4	9.283	11.946	13.99	6.37
Hg	0.064	0.039	0.046	0.031	0.045	0.01
K	3865.574	4118.493	4172.818	4432.99	4147.47	232.72
Li	0.016	0.021	0.011	0.007	0.01	0.01
Mg	304.937	366.056	308.599	349.165	332.19	30.19
Mn	0.479	0.588	0.305	0.442	0.45	0.12
Mo	0.025	0.01	0.008	0.003	0.01	0.01
Na	382.521	511.781	448.827	435.164	444.57	53.15
Ni	0.218	0.584	0.028	0.15	0.25	0.24
P	2965.555	4113.361	2403.994	2823.685	3076.65	731.11
Pb	0.148	0.365	0.078	0.125	0.179	0.13
Sb	0.005	0.002	0.001	0.001	0.00	0.00
Se	0.755	0.966	0.779	0.957	0.86	0.11
Si	27.965	28.116	27.06	25.53	27.17	1.19
Sn	0.009	0.003	0.002	0.001	0.00	0.00
Sr	2.301	5.704	0.379	1.381	2.44	2.31
Tl	0.019	0.019	0.016	0.018	0.02	0.00
V	0.018	0.037	0.027	0.029	0.03	0.01
Zn	5.191	8.826	5.377	5.986	6.35	1.69
Ca/K	0.298	0.696	0.061	0.181	0.309	0.28
Ca/M	3.781	7.832	0.824	2.304	3.685	3.02
Na/K	0.099	0.124	0.108	0.098	0.107	0.01
Cu/F	0.030	0.014	0.049	0.030	0.031	0.01
Cu/Z	0.065	0.037	0.084	0.061	0.062	0.02
Pb/F	0.0130	0.0156	0.0084	0.0105	0.0119	0.00



Site # 3 - North Fork Below Tibble Fork

	Fish #1	Fish #2	Fish #3	Fish #4	Average	Stnd. Dev.	Maximum	Minimum	Order of Magnitude
Ag	0.003	0.001	0.001	0.001	0.002	0.001	0.003	0.001	3.000
As	0.688	0.311	0.346	0.234	0.395	0.201	0.688	0.234	2.940
Cd	0.058	0.01	0.027	0.022	0.029	0.020	0.058	0.010	5.800
Cu	0.339	0.325	0.452	0.364	0.370	0.057	0.452	0.325	1.391
Fe	11.341	23.4	9.283	11.946	13.993	6.374	23.400	9.283	2.521
Hg	0.064	0.039	0.046	0.031	0.045	0.014	0.064	0.031	2.065
Mo	0.025	0.01	0.008	0.003	0.012	0.009	0.025	0.003	8.333
Ni	0.218	0.584	0.028	0.15	0.245	0.239	0.584	0.028	20.857
Pb	0.148	0.365	0.078	0.125	0.179	0.127	0.365	0.078	4.679
Se	0.755	0.966	0.779	0.957	0.864	0.113	0.966	0.755	1.279
Zn	5.191	8.826	5.377	5.986	6.345	1.688	8.826	5.191	1.700

TABBED PAGE

Soil Sample Data - Pacific Mine Site					Content in Parts Per Million																						
	sample depth	depth to clay	texture	ab/bl clay	Ca	K	Mg	Na	Ag	Al	As	Ba	Be	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Se	Tl	V	Zn
PM T1-1	1.85	>1.85	sand	ab	128	330	58.8	<27	82.6	386	10.1	957	<0.4	157	<0.6	<1.6	86.5	4910	16.1	2.9	<3.2	21000	297	1.6	<0.2	<0.4	19800
PM T1-5	0.48	>0.65	sand	ab	23	<290	34	<27	36.7	417	146	1910	<0.4	33.5	<0.6	<1.6	64.3	6250	9.3	4.5	<3.2	10800	55.7	7	<0.2	<1.4	4940
PM T1-11	3.7	>3.7	sand	ab	40.2	360	15.8	<27	23.4	211	33.6	983	<0.4	19.4	1.7	<1.6	66.3	5320	4.4	1.1	<3.2	5600	54.9	0.4	<0.2	<1.4	2630
PM T2-3A	1.25	1.5	sand	ab	27	390	11.6	<27	55.5	229	324	3240	<0.4	15.7	2.4	<1.6	47.9	14900	7.0	1.3	<3.2	15400	82	10.8	<0.2	<1.4	2380
PM T2-7	0.3	0.6	sand	ab	346	1100	1450	30	34.6	5080	216	2020	<0.4	35.2	3.9	6	135	16100	9.5	282	<3.2	5430	40	4.1	<0.2	9.8	4960
PM T2-9	1	1.2	sand	ab	27.8	390	53.3	<27	128	506	161	2660	<0.4	108	3	<1.6	132	9130	17.9	6.4	<3.2	12100	70.6	9.8	<0.2	1.6	16300
PM T2-10B	0.6	2.7	sand	ab	43.6	430	40.7	<27	45.3	454	6.4	2340	<0.4	23.4	0.7	<1.6	136	14400	7.6	3.4	<3.2	8360	76.6	0.5	0.2	<1.4	3550
PM T1-3	1.65	1.4	sand	bl	40.3	510	14.7	<27	48.9	139	258	1240	<0.4	17	<0.6	<1.6	72.3	9050	7.3	0.8	<3.2	13600	97	7.6	<0.2	<1.4	2560
PM T1-10	3.0	0.8	sand	bl	49.4	890	45.3	<27	53.5	648	68.8	1300	<0.4	33.4	2.2	3.2	268	13300	8.0	2.5	<3.2	10800	104	3	0.2	<1.4	4540
PM T2-3B	3.0	2.0	sand	bl	124	790	63.1	<27	111	939	394	1740	<0.4	93	9.2	2.4	991	22900	14.3	6.3	<3.2	18100	156	16.2	<2	<1.4	11100
PM T1-2	2.0	2.0	clay	clay	97.9	490	27.5	<27	116	504	218	1710	<0.4	23.6	4.2	<1.6	321	12100	11.8	2.5	<3.2	41800	146	15.5	0.2	<1.4	3130
PM T1-7	1.25	1.1	clay	clay	54.6	500	18	<27	28.3	326	51.2	2560	<0.4	22.1	2.8	2.9	92.4	6930	6.6	3.4	3.5	12000	35.4	7	<0.2	<1.4	3230
PM T1-9	2.35	0.7	clay	clay	172	1100	76.8	<27	123	1490	9.6	2640	<0.4	30.3	6.3	21.8	1010	25200	15.3	6.3	<3.2	35700	140	3.6	0.2	<1.4	3890
PM T2-2	0.6	0.6	clay	clay	39.6	480	22.7	<27	118	248	696	1650	<0.4	23.6	2.1	<1.6	315	21200	35.8	3.9	<3.2	27900	142	21.6	<2	<1.4	3540
PM T2-5	1.35	1.5	clay	clay	201	780	51.5	<27	115	794	7.6	1640	<0.4	39.2	4.4	<1.6	214	18300	17.3	4.7	<3.2	24100	100	6.5	<0.2	<1.4	5640
PM T2-10A	2.9	2.7	clay	clay	34.5	450	12.6	<27	87.5	214	46	973	<0.4	35.1	8.3	<1.6	1410	24500	9.2	2.4	9.9	14500	185	4.2	0.3	<1.4	4560
Average					90.6	613	125	30	75	787	165	1848	##	44	4	7	335	14031	12.3	21	6.7	17324	111	7.46	0.2	6	6047
	Above clay layer		ab	7	91	533	238	30	58	1040	128	2016	NA	56	2.3	6.0	95	10144	10.3	43	NA	11241	97	4.9	0.20	6	7794
	Clay		clay	6	100	633	35	NA	98	596	171	1862	NA	29	4.7	12	560	18038	16.0	3.9	6.7	26000	125	10	0.23	NA	3998
	Below Clay layer		bl	3	71	730	41	NA	71	575	240	1427	NA	48	5.7	2.8	444	15083	9.9	3.2	NA	14167	119	8.9	0.20	NA	6067
	Sand vs clay		sand	10	84.9	599	179	30	62	900.9	162	1839	NA	53.6	3.3	3.9	200	11626	10.1	31.1	NA	12119	103.4	6.1	0.2	5.7	7276
			clay	6	99.9	633	34.9	NA	98	596	171	1862	NA	29	4.68	12	560	18038	16	3.87	6.7	26000	124.7	9.733	0.23	NA	3998
	Ratio of [C]clay/[C]sand		cl/sand ratio		1.18	1.06	0.19		1.58	0.662	1.06	1.01	NA	0.54	1.42	3.2	2.8	1.5516	1.58	0.12	NA	2.1454	1.207	1.596	1.17	NA	0.55
Explanation:																											
	Samples are from two perpendicular transects each 300 ft in length																										
	Transect 1 was sampled every 20 ft																										
	Transect 2 was sampled every 30 ft																										
	Samples were collected at different depths in each hole, from 0 to 3.5 ft and 2 samples were collected from 2 different holes																										
	The dominant texture of the tailings is a medium to fine grained crushed quartzite.																										
	Samples above are sorted by texture and their occurrence above, in or below the clay layer																										
	A clay layer, 2-6 inches in thickness occurs at a depth of roughly 1-2 ft in nearly every hole.																										
	Sample location relative to this clay layer (above, in, or below) was noted and compared																										
	Relative concentrations of samples taken from sand or clay are also compared																										
	The "clay" layer is a limestone gouge that probably was at the margin of the ore zone at the time the site was mined.																										
	At other mine sites in the canyon, the host limestone was typically impregnated with pyrite.																										
	Primary ore minerals were galena, sphalerite, tetrahedrite, argentite, and bornite.																										
	Accessory minerals include chalcopyrite, arsenopyrite and pyrite.																										
	Mercury was probably used in the milling operation at the site and does not appear to be a product of the mine.																										
	pH of water at the portal typically ranges from 6.4 to 6.7																										
	pH of water in and on the tailings pile is near 8 or slightly higher																										
	pH in the North Fork is 8.1 to 8.3 and is typical of streams in the area.																										
	country rocks are Tintic quartzite, Ophir Shale and Madison limestone																										

TABBED PAGE

Pacific Tailings Closure Project

Uinta National Forest
Pleasant Grove Ranger District

List of Drawings Sheet No.

Cover Sheet	1
Area Closure Site Plan	2
Sign Details	3
Guardrail Details	4
Culvert Headwall Details	5
Fence Details	6

RECOMMENDED

s/ Kim Martin

Forest Engineer

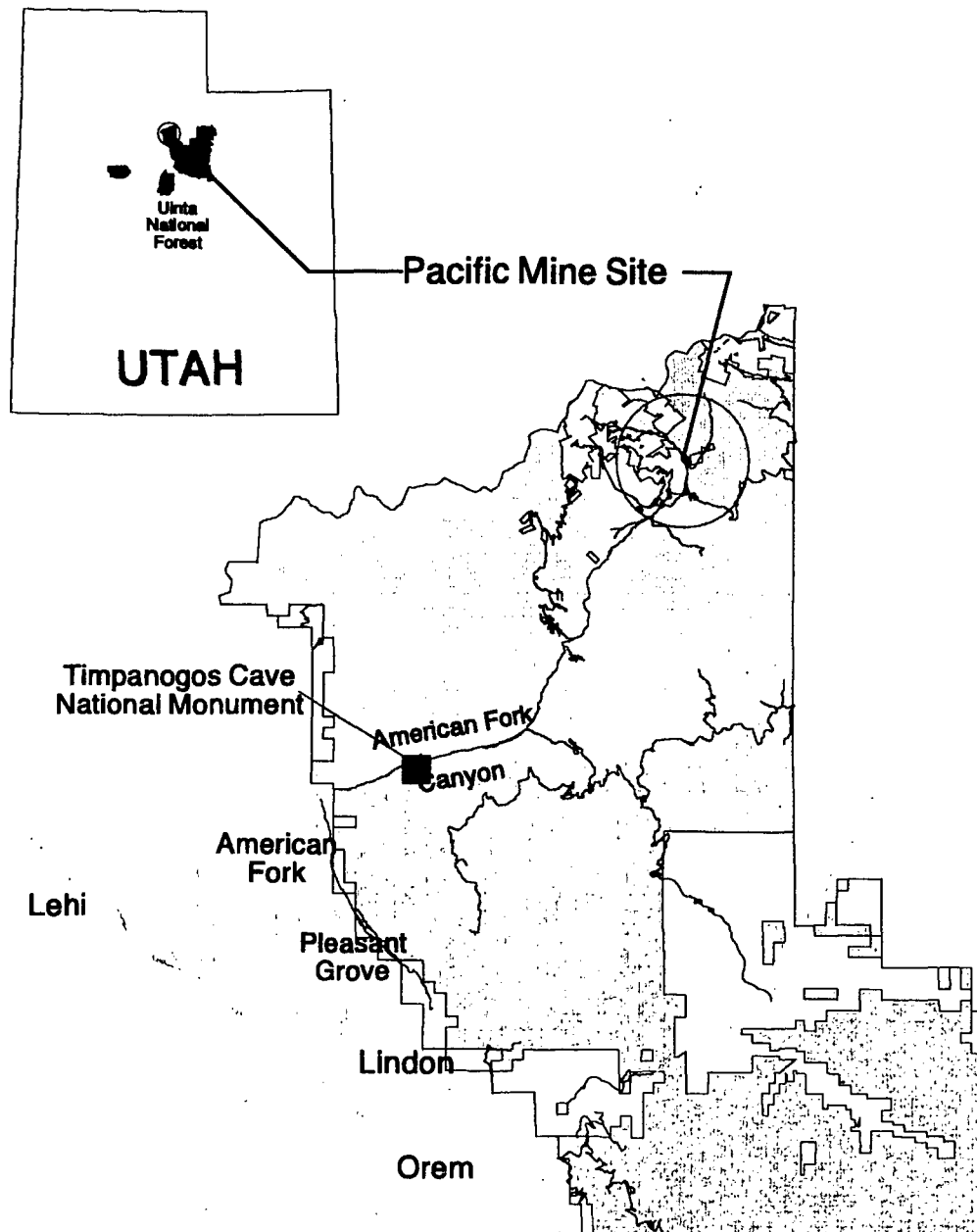
s/ Robert R. Easton

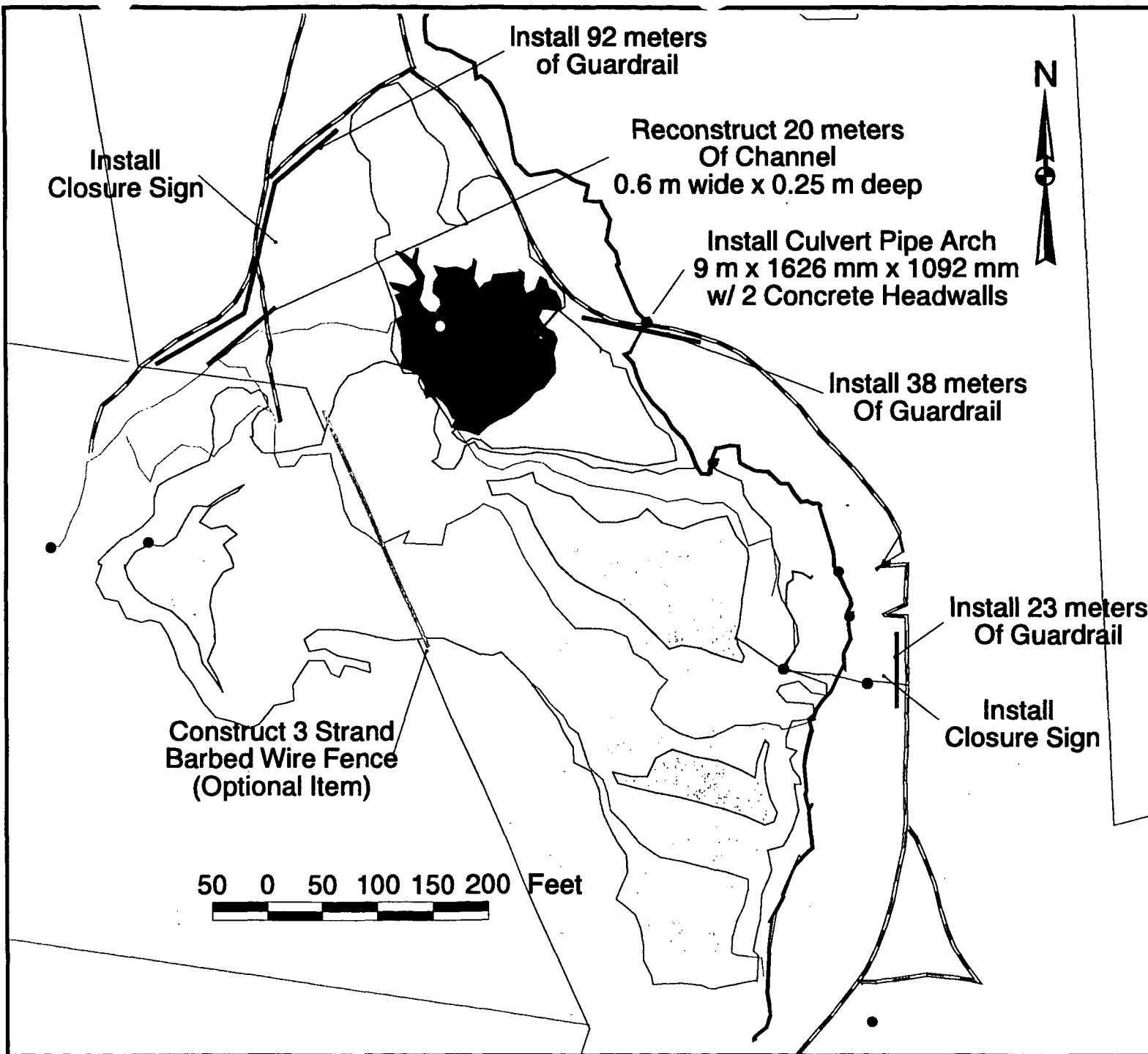
District Ranger

APPROVED

s/ Wm Reese Pope

Acting Forest Supervisor





Pacific Tailings

Area Closure Site Plan

Public Notice

PACIFIC MINE TAILINGS CLOSED

The North Fork of American Fork Canyon has been listed by the Environmental Protection Agency as a CERCLA site because the heavy metal concentrations in the river exceed Utah State Clean Water Standards. Public agencies are working with land owners to achieve reclamation of various sites in American Fork Canyon. Pacific Mine is one of those sites. Until reclamation is complete this site will remain closed to the public. Your cooperation by not entering this site is needed to assist in protecting the environment in American Fork Canyon and for your personal protection.

← Sign Panel Details

The mine tailings and waste rock pile behind this sign and barricade were generated by mining operations from the 1870's to the 1950's. These deposits contain high levels of heavy metals. Public use of this site with ATV's and motorcycles results in an highly erodable surface. Erosion from wind and water transport heavy metals into the surrounding environment, including the North Fork of American Fork River. Heavy metals in the river are detrimental to water quality, aquatic habitats, and fish. Dust containing the metals can be hazardous to human health and welfare when inhaled. Some of the metals can be absorbed through the skin. Lead poisoning could occur after prolonged exposure at this site. That is particularly dangerous for children and infants.

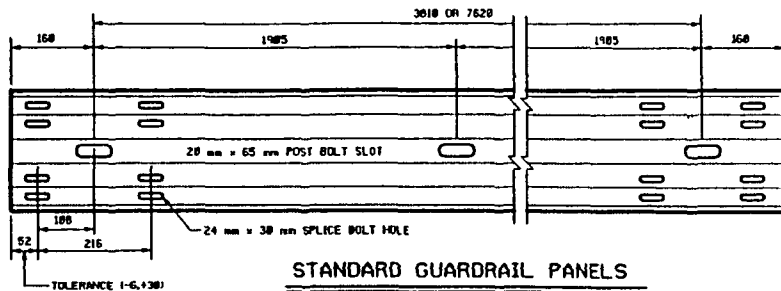
Entering the site is a violation of Federal Statutes and is punishable by citation, fine, and imprisonment.

Information about this action can be obtained at the Uinta National Forest Offices in Pleasant Grove and Provo, Utah. Your comments are welcomed.

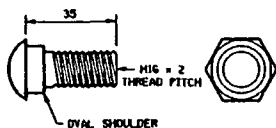
Notes: See the Contract Special Project Specifications for information on layout and construction of these sign panels.

Sign Details

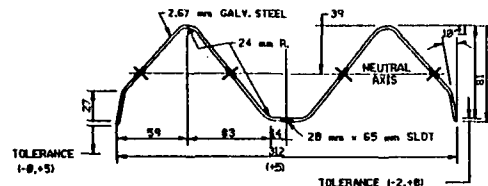
Sheet 3 of 6



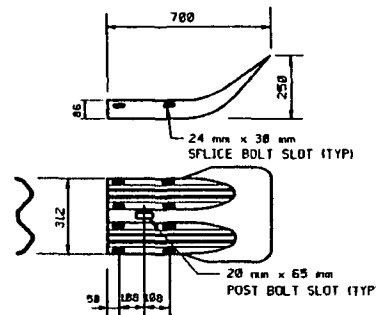
STANDARD GUARDRAIL PANELS



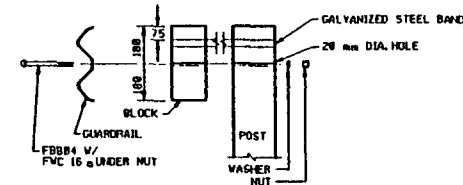
GALVANIZED SPLICE BOLT AND NUT



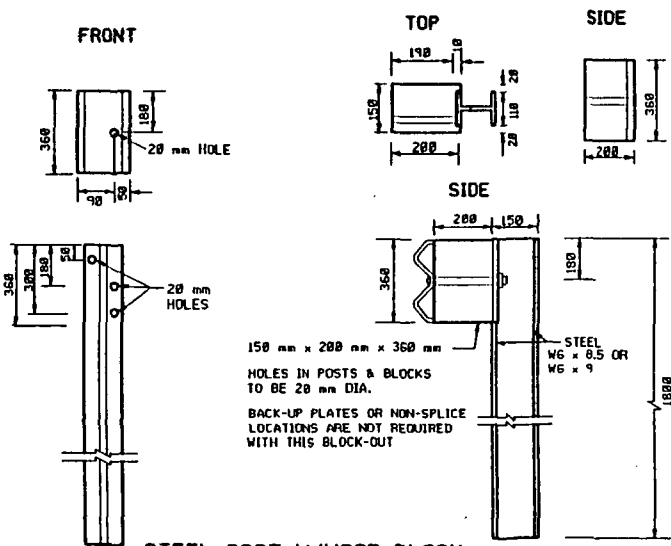
SECTION THRU RAIL ELEMENT



END SECTION (FLARED)

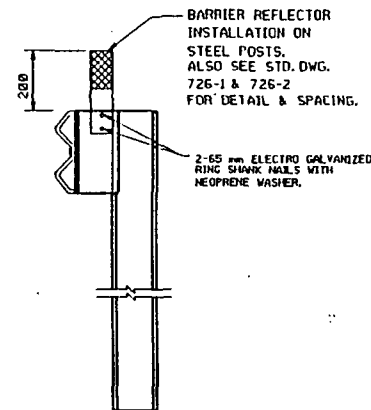


TIMBER POST BOLT HARDWARE
(GALVANIZED)

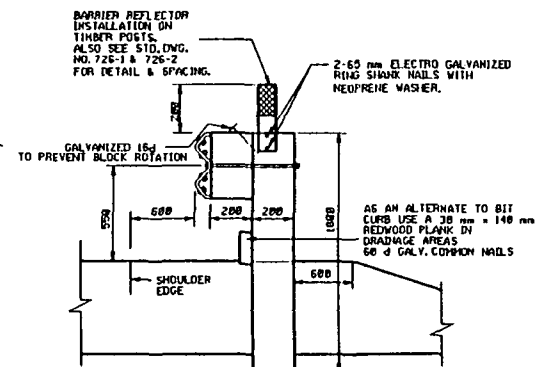


STEEL POST W/WOOD BLOCK

1/6 x 0.5 STEEL
ALL BOLTS M16 WITH HEX NUT
& CUT WASHER (GALVANIZED)



REFLECTOR DETAIL



TIMBER POST & BLOCK

(1905 MAX. POST SPACING)
DIMENSIONS: BLOCKS - 140 mm x 184 mm x 325 mm
POST - 140 mm x 184 mm x 1800 mm
S4S OR ROUGH SAW

ALL DIMENSIONS ARE SHOWN IN MILLIMETERS UNLESS OTHERWISE NOTED.

NOTE:
FLARED END SECTION SHALL BE
USED ON TRAILING END WHEN
TRAILING END IS OUTSIDE OF
OPPOSING TRAFFIC'S CLEAR ZONE.

REVISIONS		DATE		BY		REMARKS	
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UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH

RECOMMENDED FOR APPROVAL

DATE

BY

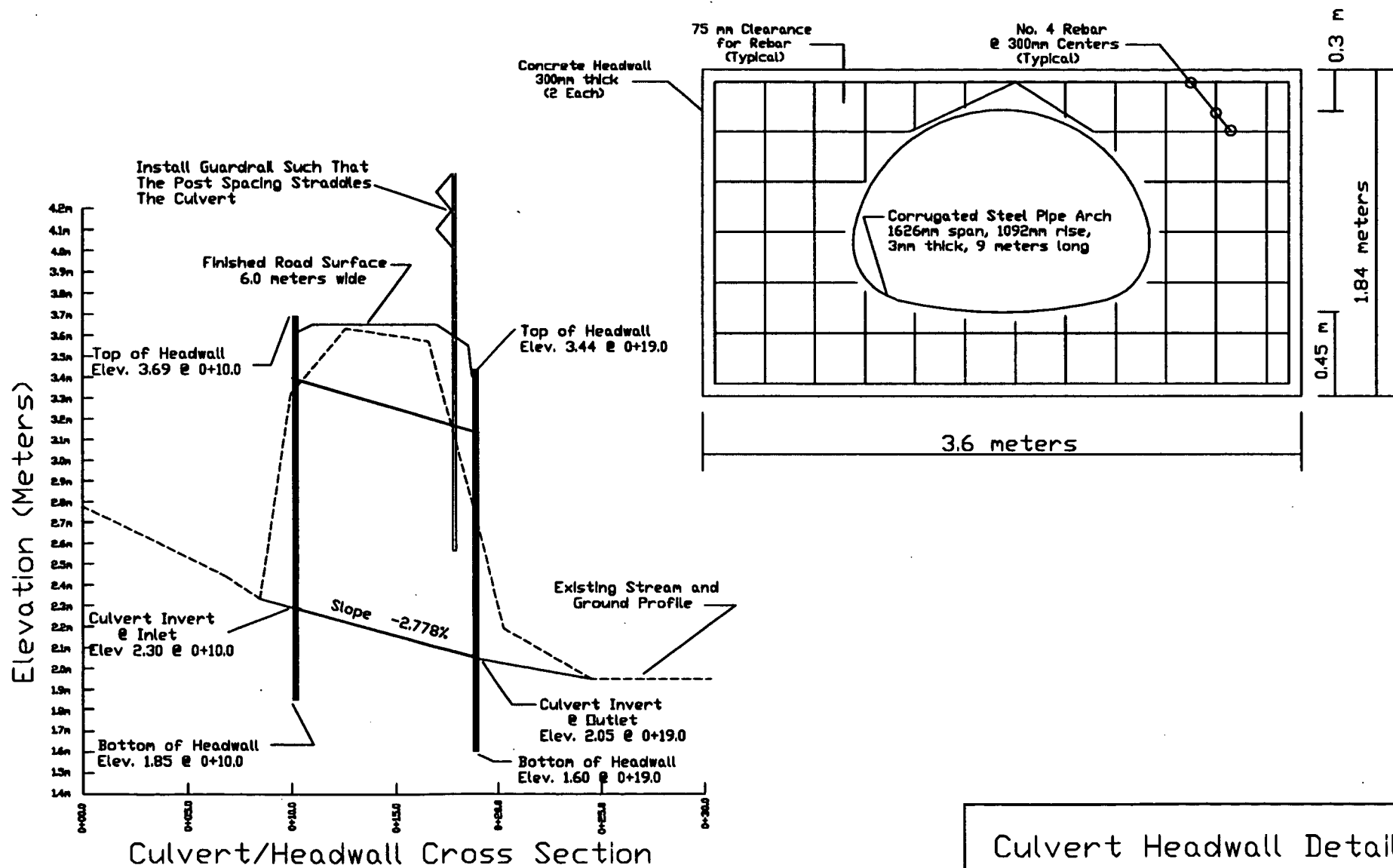
CHAIRMAN STANDARDS COMMITTEE

DEPUTY DIRECTOR

(METRIC)
BEAM GUARDRAIL
HARDWARE

STD. DWG. NO.
735-1A

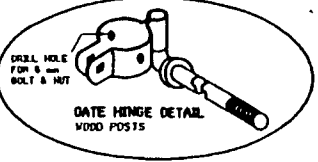
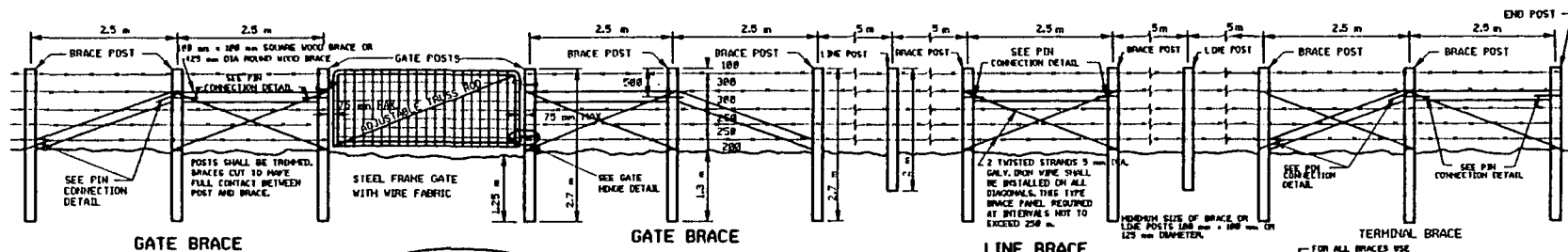
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of
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Culvert Headwall Details

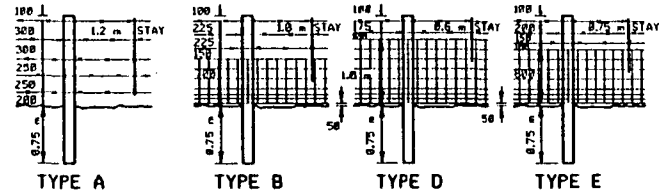
Pacific Tailings Closure Project
Designed by: Ted V. Fitzgerald
Date: July 10, 2000

Sheet
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of
6

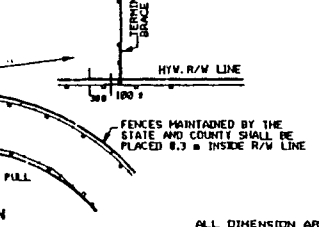
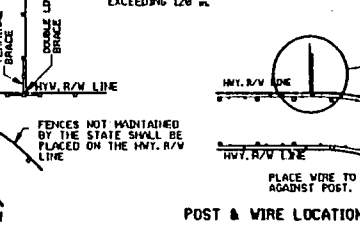
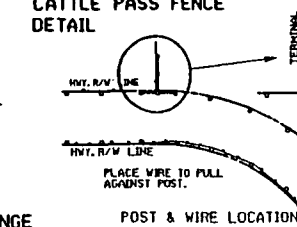
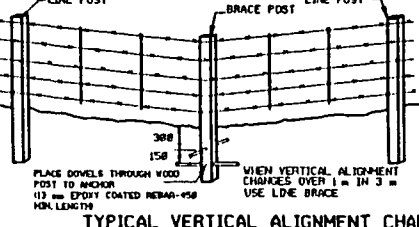
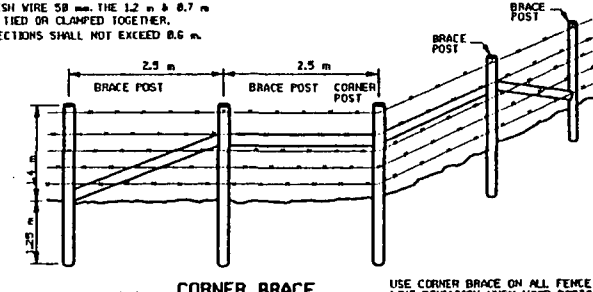
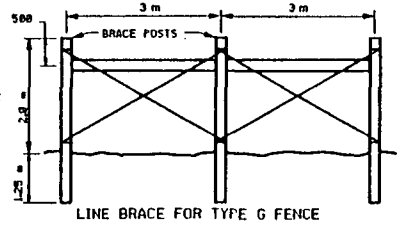
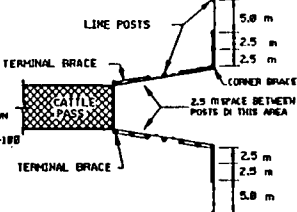
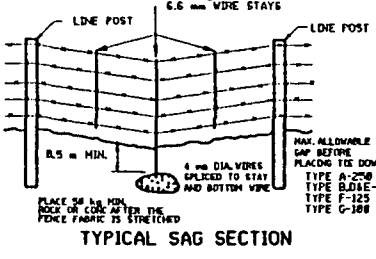
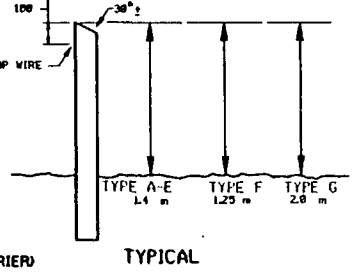
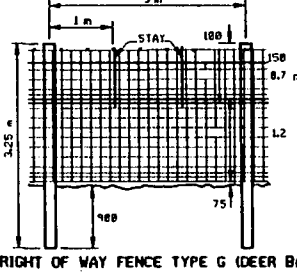
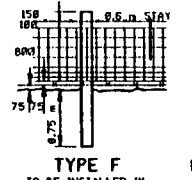


INSTALLATION WITH WOOD POSTS (TYP.)

POST SIZE, SPACING AND BRACING FOR TYPES A, B, D, E AND F FENCE SHALL BE THE SAME AS SHOWN IN TYP. INSTALLATION ABOVE. THERE SHALL BE TWO STAYS EQUALLY SPACED BETWEEN EACH SET OF POSTS.



SPACING AND BRACING TYPE F SHALL BE THE SAME AS SHOWN IN TYP. INSTALLATION ABOVE. POSTS MAY BE 2 m IN LENGTH.



ALL DIMENSION ARE IN MILLIMETERS (mm) EXCEPT AS NOTED.

REVISIONS		REMARKS
1	BY: [blank]	CORRECT ROUNDING ERROR IN GATE BRACE DETAIL.
2	BY: [blank]	CORRECT DIMENSION NOTE.
UTAH DEPARTMENT OF TRANSPORTATION		STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH		APR. 27, 1999
DESIGNED FOR APPROVAL		DATE
CHIEF ENGINEER		APR. 27, 1999
APPROVED		DATE
DEPUTY DIRECTOR		DATE
(METRIC)		STANDARD DRAWING TITLE
RIGHT OF WAY		Sheet
FENCE AND GATES		6
(WOOD POST)		of
STD. DWG. NO.		6
720-1A		

TABBED PAGE

<h2 style="margin: 0;">Record of Conversation</h2>
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Project	AFC Water: rail Restoration
---------	-----------------------------

Subject Volunteers to work on parcels

With Roger Crossland, AF Canyon Users Association

rgroslan@financialfranchise.com

☒ Telephone ☒ Meeting at *my office* *714-2175*

By Ted Date 5/3/00

Topics Discussed	Action
------------------	--------

Mr. Crossland called today while I was on sick leave.

I called him back today. He represents a young ch

people over 100 in number who have committed to performing 10 hours of labor on projects sponsored by the Forest Service

He was interested in any projects we may have through the

explained the process were involved in and the type of work that should occur.	
--	--

Some of the other things we talked about was the access into French Lake and the damms done to that area with spring in full sized vehicles. A seasonal closure rate could help there. Another pro at there are interested in is reestablishing a fence around Goosewood Flat near Dutchman Flat / Forest City. We also talked about opportunities for interpretive viewing at the various sites in the North Fork explaining some of the history of the area.

I told Rorer I would keep in touch with him as things moved ahead on the project.

Record of Conversation

Project AFC Westernsted Restoration
Subject Mine Reclamation Specialist
With Dick Gilli - Independent but partnering with Fremont Noble Associates

☒ Telephone ☐ Meeting at 801 942-3077

By Ted Date 5/1/00

[illegible]

Record of Conversation

Project	AFC Waterbird Reclamation Project
Subject	Research & Engineering
With	Dave Phillips
	SECOR Environmental Contracting?

☒ Telephone ☐ Meeting at 503-691-2030
By T-2 Date 4/6/00

Topics Discussed	Action
Mr. Phillips had seen newspaper articles about parking project. He was very interested because while at Utah State University in Environmental Engineering his Senior Group Project was metal analysis at Pacific Mine. They produced a report of their findings. I have not seen that report. It recommended the action I consider most practical and responsive at that site (per his description) - move tailings away from stream, cap them, construct wetlands, etc.	
He is now in Washington State working on Masters while employed at SECOR. He requested a meeting here to present SECOR's capabilities for performing work at the site. The meeting was set for Friday April 14 @ 1:00 pm. I reserved conference room. He has slides and paper on USU's seniors project. He will bring Chris Burgess from their office in SLG @ 1100 S. 4th.	Meeting

[illegible]

April 6, 2000. He is interested in putting a bid to clean the bridge. He left his business card so I'm forwarding it to you.

Emma Lou
Pleasant Grove Ranger District Office.

[illegible]

Record of Conversation

Project AFC Watershed Remediation Project

Subject Project Status

With Nathan Darnall 801-524-5001 ext 146 nathan-darnall@fws.gov
US FWS Service
Salt Lake City

☒ Telephone ☐ Meeting at

By Ted

Date 4/3/00

Topics Discussed

Action

Nathan called to inquire about the status of the project. I told him where we were, what we anticipated getting done this year, the timeline for the project, and the information we have collected thus far. He requested that I email him my info on the fish samples. I did that as soon as I hung up. I encouraged him to call anytime he needed any info or wanted to share his perspective/expertise on the project. He is now aware that we will be doing TSS inventories + BE/PAI this year.

Record of Conversation

Project AFC Watershed Reclamation Project.
 Subject Professional Services
 With Richard Noble
Franklin, Noble & Associates

☒ Telephone ☐ Meeting at 801 756-0309

By Teel Date 4/2/00

Topics Discussed

Action

Mr. Noble, having read about the AFC project in the paper, inquired about opportunities for consultants to assist in this project. I explained that we would be meeting with PRPs and by early June there should be an assignment of responsibilities. At that time opportunities for consultants to prepare ECA or reclamation plans could occur. I ~~strongly~~ encouraged him to send me information on his firm's involvement in hazardous waste cleanup so I can share it with PRPs. He said he would and would check back with me in June.

Record of Conversation

Project AFC Watershed Reclamation Project

Subject Recreational Mining in NFAFC

With Phil Madanza

3654 So. 6355 West

West Valley City, UT 84128

☒ Telephone

☐ Meeting at

801 965-1662

utgopr2000@aol.com

By Ted

Date 3/20/00

Topics Discussed

Action

Phil called to congratulate the FS for recognizing the need for cleanup action in NFAFC. He introduced himself as (I believe) the president of the Utah Gold Mining Assoc or Utah Gold Prospecting Association. He is interested in see the main channel of the North Fork opened to recreational dredging. He has been visiting this canyon since 1987 - told story of woman having an ATV accident at Pacific Mine on his first visit. He told of uncovering significant Mercury deposition in rock crevices in streambed near the lower toilet.

He volunteered his club to assist in cleaning up any stream sides where dredging could remove mercury or other metals.

He asked for information about the project.

Record of Conversation

Project AFC Watershed Reclamation Project
 Subject Reclamation of Mine Site
 With Greg Nichols
EnviroCon

Sandy, Utah

☒ Telephone ☐ Meeting at 801 562-8705

By Ted Date 3/17/00 1:00 pm

Topics Discussed

Action

Greg called to introduce his company to us and let me know they have been involved in several mine reclamation projects, including the Blackbird Mine in Idaho. I explained where we were in the process of getting PRPs lined up to do reclamation. He volunteered to send me company info and keep in contact.

Record of Conversation

Project AFC Watershed Reclamation Project
Subject Removal of Hazardous Waste from Soils (Tailings Piles)
With Ross Rigby

☒ Telephone ☐ Meeting at

263-7878

By Ted

Date 3/17/00

[illegible]

Record of Conversation

Project AFC Watershed Reclamation Project
 Subject Scope of Cleanup Effort & Restoration that will create.
 With Allen Chenworth

☒ Telephone ☐ Meeting at

By Tel Date 3/15/00 4:00 pm

Topics Discussed

Action

Read the article in the paper about AFC. He inquired about the scope of the work and how many acres would be impacted. I explained the water quality problems associated with "less than a half dozen mines" and the reason for cleaning it up. He asked about improving the roads. I told him that was not our intention but some sites may see spot improvement to get equipment to the site. He said he dredged and planned for material in Mary Ellen Gulch and hoped to see some road improvement. He asked why some areas are closed to (sucker) dredging. I gave him a few reasons then I referred him to Bob Eastone.

Record of Conversation

Project

Subject

With Phyllis Winters

Salt Lake City, Utah

☒ Telephone

☐ Meeting at

320-6808

By Ted

Date

3/15/2000

2:00 pm

Topics Discussed

Action

Read the Desert News article and spoke with the reporter Sharon Haydock who referred her to me. She wanted information about the land owners who may be responsible for the cleanup of AFC. She stated she hated to see any of those lands removed from use by recreationists. I explained briefly the levels of contamination in the mine tailings to demonstrate the need to "trust" those parcels and protect recreationists & visitors as well as public resources. I told her about the "missing" records at the Courthouse and the laboratory effort to find ownership of the sites. I also told her that we (FS) had contracted to have that ownership traced and the voluminous report we received. I explained briefly the FOIA process and how she could request that info from Pete Kerp. I told her I did not know if that information would be proprietary or not but it was that would be one of the quickest ways to get the information. I could have her typing the info as we talked so I expect a letter (FOIA) will be coming.

Record of Conversation

Project AFC Watershed Reclamation Project
 Subject Hazardous Waste Cleanup Efforts
 With Dennis Christensen, Continental Lime

☒ Telephone ☐ Meeting at

801-281-5401

By

Date March 15, 2000

11:00 am

Topics Discussed

Action

Dennis read the newspaper article about the problems with heavy metals in AFC. He wanted to introduce his company (he's a consultant) and let us know they have been involved in reclamation efforts at the Anaconda Mine, Montana. His company produces at least 3 products that have proven beneficial with acid mine drainage: lime, hydrated lime, and kiln dust. I explained the pH of our water is not very acidic because of the limestone deposits in the canyon. I asked him for more specific info on the uses they have presented at other sites. He said he would get the info from the company and get back to me.

None

Record of Conversation

Project AFC Watershed Reclamation Project
 Subject Removing Heavy Metals from Mine Drainage
 With

Steven Izott, IBC Advanced Technologies

American Fork, Utah

Phone 801 763-8400

☒ Telephone ☐ Meeting at

FAX 801 763-8491

By Ted Fitzgerald

Date March 15, 2000

9:22am

Topics Discussed

Action

Steve called to introduce his company which specializes in removing minerals from water using a technology that captures the minerals on plates over which the water flows. He referred to this as Molecular Recognition Technology - Fixed Bed Systems. Depending on the metals involved this system could pay for itself by producing metals that could be collected and sold. He said it could remove lead though there is low value (\$) associated with lead.

I agreed to FAX Steve some water quality reports and soils data from the Pacific Mine. He will look at that data to see if their process would be a viable application at these sites. He will also consider the possibilities of re processing the tailings to recover the metals there.

Done 3:45pm

March 10, 2000

Dear Bob Easton,

This letter is in response to the Silver Lake Dam and Ted Fitzgerald's comments to mayors about American Fork Canyon mines. I can tell there is a new man on the block. Definitely some authority and turf being established.

Several years ago on Thanksgiving morning, after the Utah State Engineer made the declaration and we made a trip to Silver Lake to open the valve to lower the lake. We discussed the potential danger if Silver Lake were to break. Even if it were to fail like other earth dams have failed, the flow of water would be so insignificant that it might raise Silver Lake Reservoir six inches to a foot. The surge of water from the dam would flow down the bottom of the canyon which is below the new trail. People should stay on the designated trail to the lake anyway. There is very little threat to people already.

Water has been sitting there since the ice age with a rise to thirteen acres since 1907-1908. In that period of time the soil and rock has settled and re-established. It is ridiculous to disturb it. When you consider the threat and the logistics of the lake. There is "low" or "no" danger.

My recommendation is "LEAVE IT ALONE." (Maybe we could pour one 50 lb. bag of ~~putting~~ cement on it so the Utah State Engineer's office could see action has been taken.)

The Ted Fitzgerald issue is interesting. If the tailings are moved or disturbed, they will increase the heavy metals in the water. Those mines were primarily worked in 1870's-1930's. They represent the history of American Fork Canyon. The Forest Service has already destroyed most of those historical landmarks of American Fork Canyon by closing, burning, covering, gating and removing this museum. There isn't much left for those of us, who call this home, to enjoy scenic memories of the past.

The water that flows from the mining district is used for irrigation. The cities in the north end of the county do not pipe water from any of the streams from American Fork Canyon. American Fork pipes some water from the parking lot of "The Stone House" at Timp Caves but it is not direct stream water. No other culinary water comes directly from American Fork Canyon. Any water coming from any mountains around here are going to have levels of minerals and metals.

The fish in the creek have been living there and I have been fishing and eating them for 53 years. I have lived a good life so far. I don't think I suffer too much brain damage or learning disabilities from heavy metals from fish in Am Fork Canyon.

Besides, its my decision to fish and eat fish from the canyon. It is not the Forest Service's fault. I have even known for years that there is water coming from the mine tailings. Does it really matter if someone wants to call it class A or class B or even a blue ribbon fishery. It has been this way since 1871 when mining started in American Fork Canyon. I've noticed that with more people working in government offices, more precise technical equipment, and more environmental oriented people that we are losing more freedoms to use public lands.

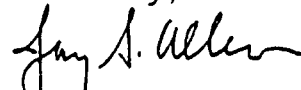
If you mandate people disturb the tailings, you are causing a bigger problem than leaving them alone. It will release more minerals and metals into the streams. The sad part of this issue is, "More of my freedoms in the forest are being taken away." I choose to ride my motorcycles on the tailings at the Pacific Mine. At least it gives me an option where Uinta National Forest has already closed the foothills above Pleasant Grove and most of the roads I used elsewhere in Diamond Fork, Strawberry, and American Fork Canyon. Why should Ted restrict that freedom at the Pacific? I like to visit the mine sites. I've breathed dust from the Pacific mine since I was 16 years old. At least I had a right to choose. If I die tomorrow from a leaded brain, at least I had the freedom to enjoy riding my ATV on the tailings.

Why should one man's opinion eliminate that historic freedom? I hope the Forest Service lives up to their motto. Instead of closing, gating, locking, banning, restricting, illiminating roads and prohibiting me from using American Fork Canyon and the Uinta National Forest, let me use my public lands. I want my children and especially my grandchildren to enjoy some of the experiences I have enjoyed.

You are a friend and wise manager. Keep up the great job. Help me protect my heritage and greatest love, American Fork Canyon and the mining district. There are thousands of people who love the stories, visit the mine sites, and learn from the rich history of American Fork Canyon. Silver Lake and the mines in the canyon are two of the richest assets this canyon holds. Help me educate Ted Fitzgerald, The Regional Forester for the Intermountain Region, and other Forest Service staff who come here from other areas. Sometimes these people do not take the time to consider the impact of their actions on Jay Allen's life. Born and raised here! Thank You!

cc: Peter W. Karp
Ted Fitzgerald

Sincerely,



Jay S. Allen